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DEATH-RATES IN OLD AND YOUNG STATES

T. D. Tuttle, M. D.

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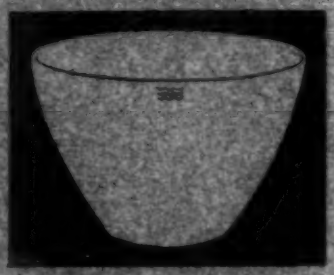

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DEATH-RATES IN OLD AND YOUNG STATES.

T. D. Tuttle, M. D.,
State Commissioner of Health of Washington, Seattle, Washington.

Read before the General Sessions of the American Public Health Association, Cincinnati, Ohio, October 27, 1916.

IN 1915 I was appointed State Commissioner of Health for the state of Washington. I found that this state showed a remarkably low death-rate of 8.0 per thousand population. I believed that such a death-rate could result only from a lack of complete registration of deaths. However, after checking the death returns in every conceivable manner, I was convinced that they were as complete in Washington as in most, if not in any, of the states in the registration area.

My opinion in this matter was confirmed by Dr. C. L. Wilbur, who in the spring of 1916 made a thorough investigation of the registration work in our state. Without his having so stated to me, I am firmly of the opinion that Doctor Wilbur did not find a single death in the state of Washington for which we could not produce a death certificate, with the possible exception of a few that had occurred on the federal reservations, over which we have no control.

It is then evident that the low death-rate in Washington, and this applies to most of the Rocky Mountain and Pacific Coast states, is not due to imperfect registration.

Having become thoroughly satisfied that the deaths in the state of Washington are being properly recorded, I found myself confronted with this question: "Has the state of Washington a death-rate of 8.0 per thousand population, or is it barely possible that the Federal Census Bureau is not quite infallible in the matter of estimating populations?" I, therefore, started a search for evidence as to the accuracy or inaccuracy of the estimated populations, and found that in the 1908 report of the Census Bureau, populations for the various states were given at certain figures, these figures being the result of estimates made from the 1890 and 1900 census counts, and from counts made by certain states at various intermediate periods. In the 1909 report of the Census Bureau, I

found that the states were credited with entirely different populations, this latter set of figures being based on the 1900 and 1910 census count. I found that these figures varied in the two reports from as much as 513,241 in California, to as low as 1,104 in Vermont. The total population of the seventeen states in the registration area in 1908 is given at 38,384,382, as based on the 1910 census, whereas the estimate in 1908 was only 36,690,955, or a difference of 1,693,427. But this is not the entire variation, for some of the states were overestimated while others were underestimated, so that the actual variation was in reality 2,051,407. (See Table I.)

It is evident, then, that the estimated population is, by their own publications, admittedly inaccurate. While one might, in a charitable mood, admit that the estimate for the entire seventeen states as a whole is fairly accurate, one cannot possibly admit that the estimate for the individual states, with the possible exception of six, is fairly accurate as to the numbers, nor that it is a fair estimate upon which to base a death-rate for the individual states. But the whole story of the variations in populations is not told in these figures. In estimating the population for each year it is assumed that the growth was equal throughout the ten-year period. Now there is no more foundation for assuming a constant growth in the population of a state than there would be in assuming that the vertical growth of a boy would be the same each year for a period of ten years from eight to eighteen. "It simply isn't done." As a matter of fact, it is very probable that the population of the state of Washington was very nearly as great in 1908 or 1909 as it was in 1910, and that it increased comparatively little between 1900 and 1904 or 1905. In other words, the greatest proportion of growth from 1900 to 1910 occurred between 1904 and 1908 or 1909, and the population estimate based on the census of 1910 is at variance with the facts to just the extent that the growth varied in different years. It is, therefore, evident that the population of various states, as estimated by the Census Bureau is frequently far from correct and results in misleading death-rates.

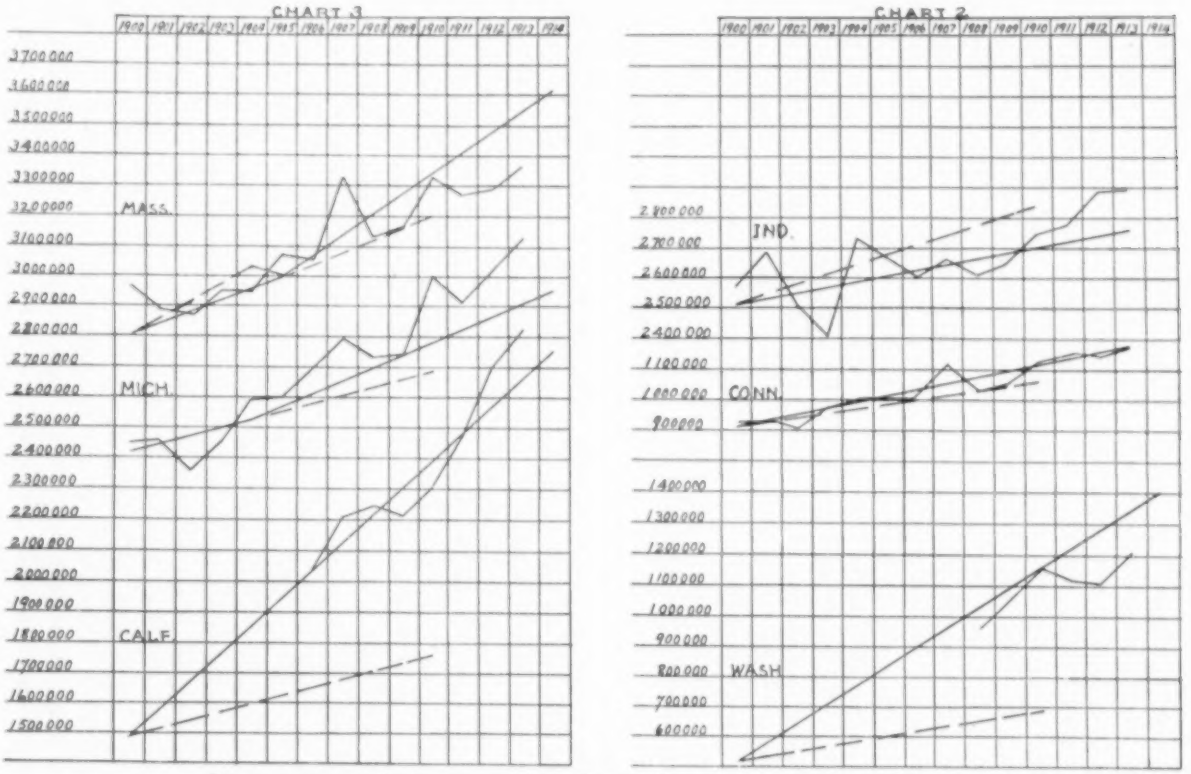
I believe this sufficient evidence to prove that, while the estimated population as made by the Census Bureau may be a fair average for the entire country, it is not fair or just as it pertains to the individual states, and especially to the younger states, as a basis for estimating death-rates. The question naturally arises, "Is there a method by which the estimated population may be checked or by which an entirely new estimate may be made that would prove more equitable?" In considering this question it must be remembered that in many instances, if not in the large majority, the local and state registrars of births and deaths are also health officers. They are, therefore, in a position equi-distant between his Santanic Majesty and a deep pit of water of sapphire hue. That is, they are expected to exert every effort within their power to prevent disease and death, and, on the other hand, they are expected to return

a sufficient number of deaths to satisfy the ideas of the Washington authorities as to what is proper. If by the neglect of one function they manage to satisfy Washington, they may become swamped by the sapphire wave from their home people. On the other hand, if they fail to satisfy Washington, they are inundated by the same wave because Washington throws them out of the registration area or fails to make an estimate of the death-rate, which has the same ultimate effect. Therefore, some method of estimating population should be worked out whereby the local health officer may be given credit for his work in preventing deaths, and, at the same time, credited with the death-rate to which his locality is entitled, be it high or low.

In confronting this question I undertook to see if there is an actual relation, year in and year out, between population and death returns, and if such relation exists can it be used in such a manner as to give credit to the work done in the matter of preventive medicine? With this idea in view I studied the death returns from many states and from many of the principal cities. At this stage of my investigation I found that should I include all the states and all the principal cities in the registration area, the result would be a very bulky affair. I, therefore, selected six states and six principal cities, as follows: Two each from the Atlantic Coast, namely, Connecticut and Massachusetts, and Boston and Richmond, Va.; two each from the Middle States, namely, Michigan and Indiana, and Detroit and Indianapolis; and two each from the Pacific Coast States, namely, Washington and California, and Seattle and Portland: Believing this a fair average of the entire registration area, I have used the figures for these states and cities throughout this report.

The question under consideration is, "Is there a constant relation between populations and deaths from non-preventable diseases?" I, therefore, deducted from the total number of deaths in each area the deaths from the following diseases: Typhoid, tuberculosis, measles, scarlet fever, whooping-cough, diphtheria, and enteritis in children under two years of age.

After deducting deaths from these preventable diseases from the total deaths in each locality, I estimated the death-rate from what I designate as "non-preventable" deaths. In making this estimate I used the population as given in the re-estimate of the Census Bureau in the vital statistics report for 1909, this being the more nearly accurate of the two sets of figures published. I then found the average death-rate from non-preventable diseases for the 10 years from 1900 to 1909, and with this average and the number of deaths from non-preventable diseases, estimated the population for the various years. The results of this study are set forth in Tables IV and V. They, together with the results set forth in Table I, are illustrated in Charts 2, 3, 4, and 5. In Charts 2 and 3 the six states used are represented. The broken line represents the population



POPULATIONS AS ESTIMATED BY U. S. CENSUS BUREAU AND BY DEATH RETURNS.

Broken line represents estimated populations based on 1890 and 1900 Census. Solid straight line represents populations based on 1900 and 1910 Census. Irregular line represents populations based on Death Returns.

as estimated by the Census Bureau from 1900 forward, and the solid line represents the population estimated forward and backward from 1910. The broken line is extended from 1908 to 1910 simply to show where it would have ended had the estimate been continued. As a matter of fact, the Census Bureau discontinued its estimation along this line in 1908. Note the wide divergence between the solid lines and the broken lines in Washington and California. Note the curve in Massachusetts as a result of using the state census in 1905. Also in Michigan as a result of using the census from 1900 to 1904. Now follow the irregular line which represents the population as determined from deaths from non-preventable diseases. Note how closely it follows the reëstimate for Connecticut. How it indicates that the population of Michigan, California and Indiana is underestimated, and how the population of Massachusetts and Washington is overestimated from 1910 forward.

In 1910, with a known population, the state of Washington showed a death-rate of 10.0 per thousand. In this year 21.5 per cent. of all deaths were caused by preventable diseases (see Table IX). In 1913 only 17.1 per cent. of all deaths were caused by preventable diseases. Thus through sanitary efforts, we have reduced in 1913 our total number of deaths by 4.4 per cent.

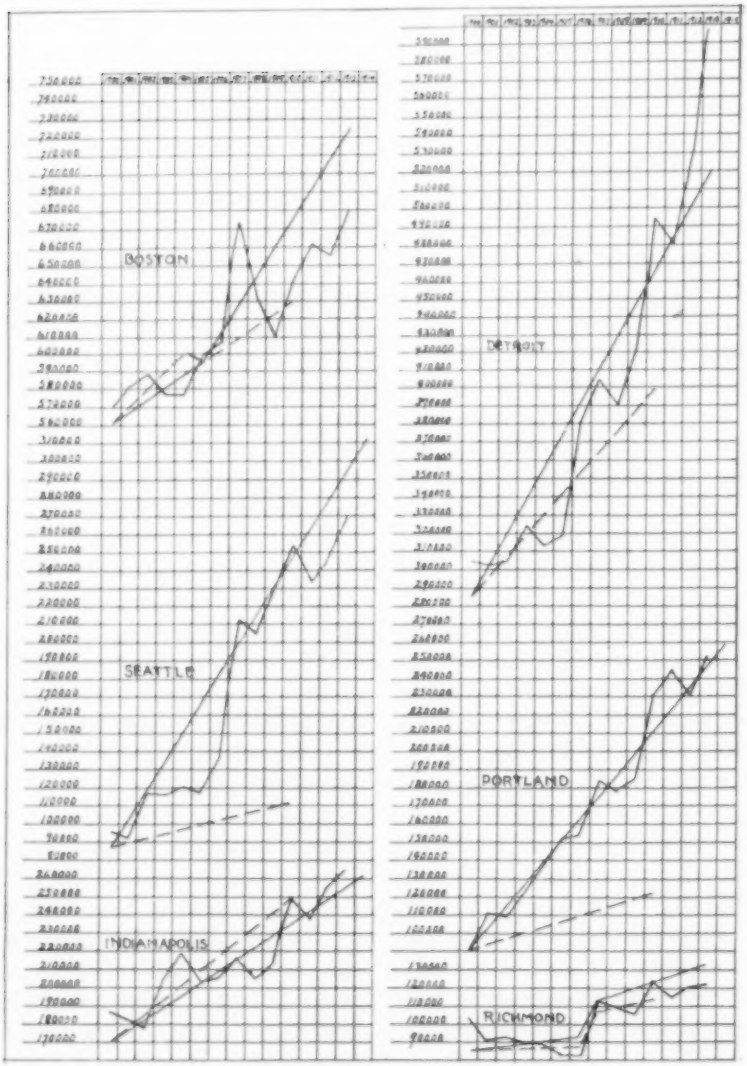
We recorded 11,397 deaths in 1913. This means that, had our death-rate for preventable diseases remained the same in 1913 as it was in 1910, we would have recorded 501 more deaths, or a total of 11,898. This would give us a death-rate, based on the Census Bureau's estimate of population, 8.8 for 1913, and thus accounts for 0.8 of the reduction in the death-rate between that of 1910 and that of 1913.

The balance of the reduction between these two years we can account for only on the assumption that the population is overestimated, and we therefore believe that the population as estimated from the death returns is more nearly accurate than that estimated by the Census Bureau.

Following the same method of procedure, we find that the death-rate in the state of Massachusetts is either 15.8 instead of 15.0 for 1913, or else their population is overestimated. If it is claimed that public health work influences the death-rate in diseases other than those classed as preventable, and in this way Massachusetts' death-rate is actually brought down to 15.0 per thousand, then the same credit must be given to Washington and her death-rate be accredited as 8.0 per thousand.

Note that in every district studied there is a marked rise in the irregular line in 1907. In submitting this study I do not profess to have carried it to its ultimate end. In order to make this method of estimating populations accurate and of value the vital statistics report must be gone into very thoroughly. However, a very casual study of the death records of 1907 shows that much of this rise was due to influenza. In any instance an unusually marked rise or fall in the num-

CHART 4.



Populations as Estimated by U. S. Census Bureau and by Death Returns.

Broken line represents estimated populations based on 1890 and 1900 Census. Solid straight line represents populations based on 1900 and 1910 Census. Irregular line represents populations based on Death Returns.

ber of deaths calls for a careful study of the causes of death during that year and for confidential coöperation with the state and local authorities in regard to causes for such rises or falls in the number of deaths.

Now let us consider Chart 4. Here we have the same matter represented for cities that we have considered for states. Note the identical conditions with regard to Boston as noted with regard to Massachusetts. Note the peculiar curve in estimated population lines for Richmond in 1907. Now note the sporadic growth in Seattle. The irregular line diverges downward from the reëstimated line in 1903 and 1904, then it turns upward and crosses the reëstimate line in 1907, here going above on account of the general high death-rate throughout the country in this year, falling slightly below 1908 and coming up again in 1909 and 1910. Now this appears sporadic and unnatural, but as a matter of fact, it is perfectly natural. Seattle did grow very rapidly from 1905 to 1909; since then the growth has not been so rapid. This is not a mere theory. The Census Bureau has, or could easily obtain, information supporting this statement.

I submit herewith a clipping from the *Post-Intelligencer* of February 28, 1916. (See Chart 5.) This is a chart intended for advertising purposes and hence cannot possibly be construed as giving Seattle any the worst of it. Note real estate transfers from 1905 to 1910. Note building permits line from 1905 to 1910, and how this line falls off in 1910. Note population line, said to be based on Polk's Directory, but if this line is a result of Polk's statistician, it certainly seems to me that this statistician must have roomed with, if he did not sleep with, the statistician that estimates the population for the U. S. Census Bureau. Their findings are too closely related for even the idea of brotherhood to account for their mutual likeness.

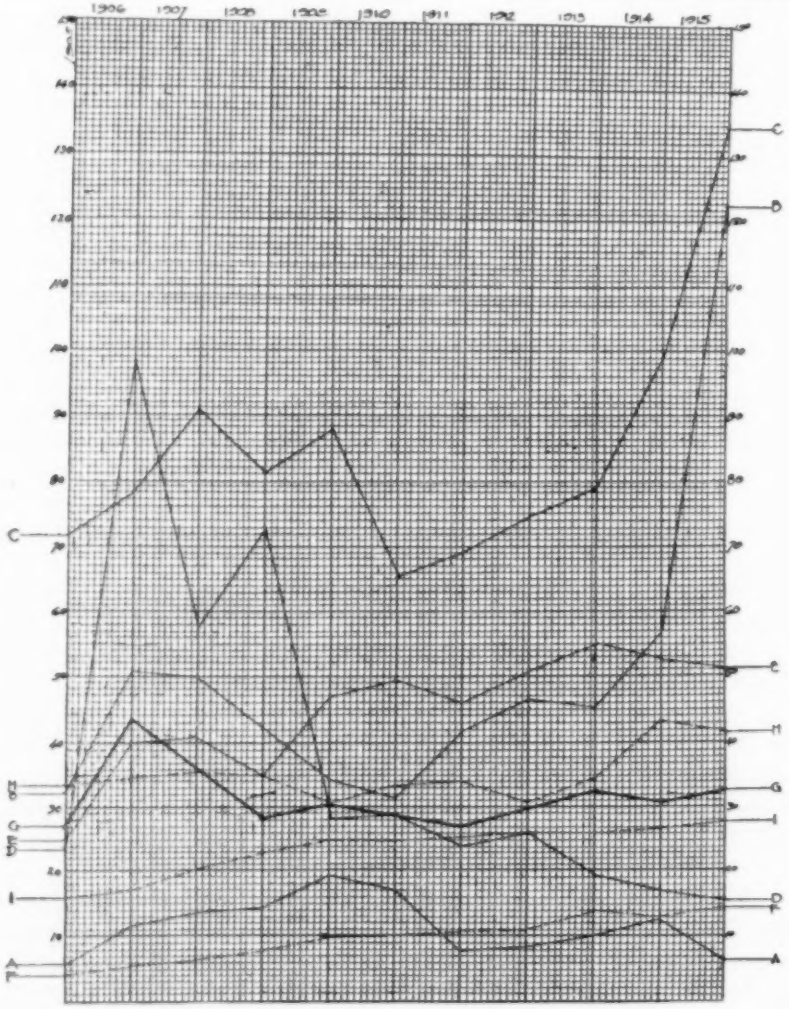
While I realize that the decimal point system now followed by the Census Bureau in estimating population is most simple, I hold that this method is grossly inaccurate. While it may be used as a general basis of estimate, nevertheless, when the irregular line indicating population based on death returns materially diverges from the solid black line, the bureau should consider the question of where the error lies. If after studying the causes of deaths in a locality, the business conditions that may tend to bring new population in or to draw population away, and if after taking the matter up with the local authorities as to any unusual causes of deaths, it is found that the population is probably under or overestimated, then make an estimate based on actual facts as they exist in the year under consideration and not as they existed eight or ten years prior thereto.

Following the irregular line indicating populations based on death returns in the state of Washington and in the city of Seattle, it must be remembered that with improved conditions in the lumber business and general return of prosperity, it is entirely possible that this line may swing

CHART 5.

SEATTLE BUSINESS CHART

1905 to 1915, Inclusive



Compiled by The Long Building Company, Architects and Builders, Seattle.

KEY

A—Building permits	Seattle	each small square	$1,000,000
B—Foreign commerce (water)	Seattle	each small square	1,000,000
C—Domestic commerce (water)	Seattle	each small square	1,000,000
D—Real estate transfers	King County	each small square	1,000,000
E—Bank clearings, monthly average	Seattle	each small square	1,000,000
F—Postoffice receipts	Seattle	each small square	100,000
G—General per capita average of above	Seattle	each small square	100
H—Total tax levy	Seattle	each small square	one mill
I—Population, based on Polk's directory, using multiple for 1900 and 1910 federal census	Seattle	each small square	10,000

NOTE—To secure annual totals add small squares, beginning at bottom of chart at right marginal line for year desired.

upward—undoubtedly will swing upward—and may reach and even pass the solid black line at or before the next census period, and thus apparently prove the estimate of the Census Bureau correct; but the proof will be only apparent and not actual. I have not presented the figures from Montana but I am absolutely satisfied that the population of Montana is proportionately as grossly underestimated today as that of Washington is overestimated. Note the rapid rise in death-rates in Montana during the last five years. This is an unhealthy rise, it is unnatural it is, in short, simply absurd.

Recognizing the inaccuracies in estimated populations, the next question is, "What influence have such inaccuracies in the death-rates on the various states?" Table I–a is simply a copy of the death-rates as given in various vital statistics reports, the six cities being selected to illustrate this point. Inspection of this table shows that the death-rate, as estimated prior to the 1910 census, varies from that estimated after this census to as great a degree as 5.5 per thousand population. In the reports for 1906, 1907 and 1908, no statement is given regarding the population of the city of Seattle. However, in the 1906 report we find a death-rate for Seattle of 12.7, and in 1907 report a death-rate for Seattle is given as 15.7. On looking the matter up I found that had the same rate of increase in population been allowed for each of these years, as had been allowed for the years 1900 to 1905, that the death-rates would have been respectively 14.5 and 19.0, and the rate for 1908 would have been still higher. I, therefore, wrote the Census Bureau and asked that I be given the figures showing what their estimate of population of Seattle was for 1906 and 1907. I received a reply but not the information requested. Naturally, knowing the number of deaths and death-rate allowed, one can easily figure the population assumed but how and by what method this particular number was arrived at is a question that baffles me. Regardless of how this particular irregularity was worked out, the actual published figures show a variation of 5.5 per thousand in the death-rates for Portland, on account of having found that the estimated population in 1908 was inaccurate.

As the same methods of estimating populations are used today as have been used heretofore, are we not perfectly justified in assuming that the estimated population of the various states is as inaccurate today as in 1906, and that some states or cities are being credited with nearly four per thousand higher or lower death-rates than they are entitled to receive?

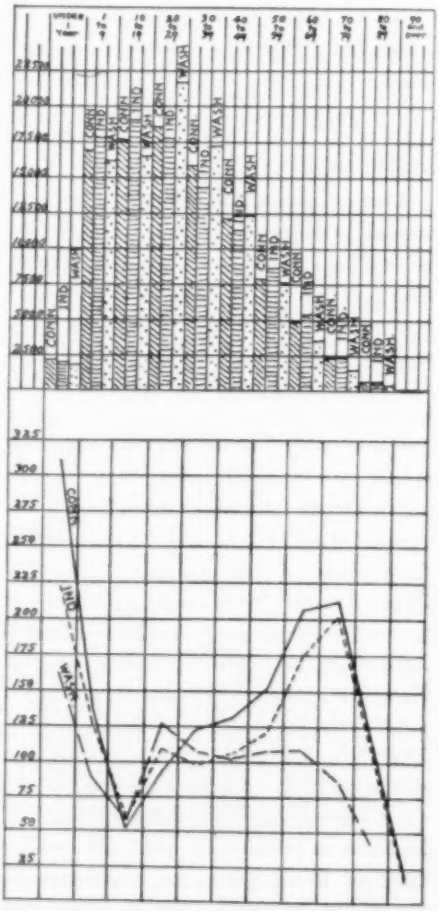
Recognizing the fact that with the lowest possible estimate of population, the state of Washington still shows a remarkably low death-rate, I undertook to determine in what ages the deaths took place. I therefore estimated the death-rates per 100,000 population for certain ages. These death rates are based on total population and not on population of a specific age. The population used in this estimate is the population as given

in the vital statistics reports, these being "corrected" to bring them up to certain months. All deaths in unknown ages are eliminated from consideration, as I did not feel inclined to guess where they probably belonged. The result of this study is set forth in Table II.

Finding that the death-rate for the state of Washington reached and even exceeded that of the other states studied in certain ages, I questioned "Is there a relation between the age distribution and this death-rate?" I, therefore, estimated the population in each age period per 100,000 total population. In this and in all subsequent studies where the age question is involved, the population used is that as given by the Census Bureau report for 1910, without any correction whatever to bring them up to any particular month; and in every instance populations and deaths of unknown ages are eliminated from consideration.

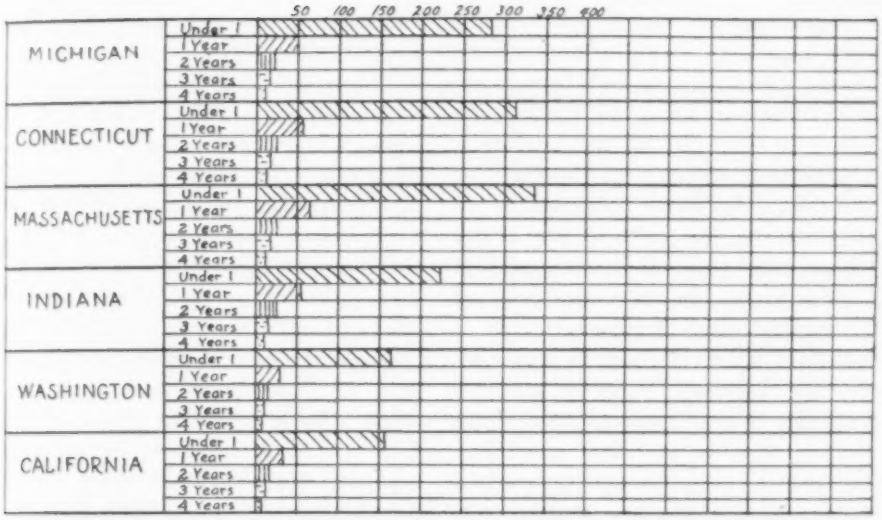
In this latter study I confined myself to three states and the result is set forth in Table III. These figures being of especial interest to me, I attempted to bring them out through means of tracings, as represented in Chart 1. It seems to me evident that Washington is getting her death returns in certain ages as completely as is Connecticut or Indiana. This being the case, it does not seem reasonable to assume that she is selecting certain ages on which she insists that all deaths be recorded and neglects to insist that deaths be recorded in other ages. In other words, it does not seem reasonable to assume that an undertaker would take a chance at burying a body 60 years of age or 5 years of age, without having procured a proper permit and having filed a certificate of death, and, at the same time, be very careful to file the death certificate for the body of a person 20 years of age. I do not maintain that this is sufficient evidence to prove that Washington is receiving com-

CHART I.

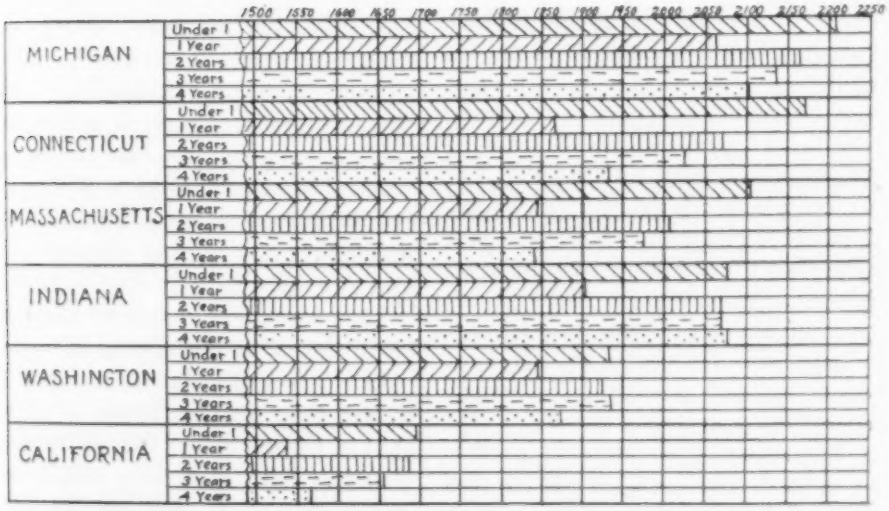


Populations and Deaths by Ages Per 100,000 Total Population.

CHART 6.



DEATH-RATES FOR CERTAIN AGES PER 100,000 TOTAL POPULATION FOR 1910.



POPULATIONS IN CERTAIN AGES PER 100,000 TOTAL POPULATION FOR 1910.

plete returns of her deaths, and, accordingly, I have carried this study farther.

One point on which great doubt with regard to death returns of the Pacific Coast is frequently expressed, is that of our infant mortality. We are told that the infant death-rate, especially in the city of Seattle, is so low that it indicates unjustifiable enthusiasm on the part of the health officer, and is, therefore, not worthy of consideration. Is there any evidence to support such an assumption? I maintain there is no such evidence. On the contrary there is evidence available that supports our death records relative to infant mortality. In Table VI you will find the population in each of the five primary ages of life per hundred thousand population. In Table VII you will find the death-rate per hundred thousand population for each of these ages. In Table VI you will find the per cent. of reduction in the number of people between under one year and one year of age. Note the reduction in Connecticut is 13.8 per cent., while that in Washington is only 4.4 per cent. Let us turn to Chart 6, where Table VI and VII are represented. Here you will note that the reduction in population between the under one year and one year of age period corresponds very closely with the death-rate per hundred thousand population, as represented in upper half of chart.

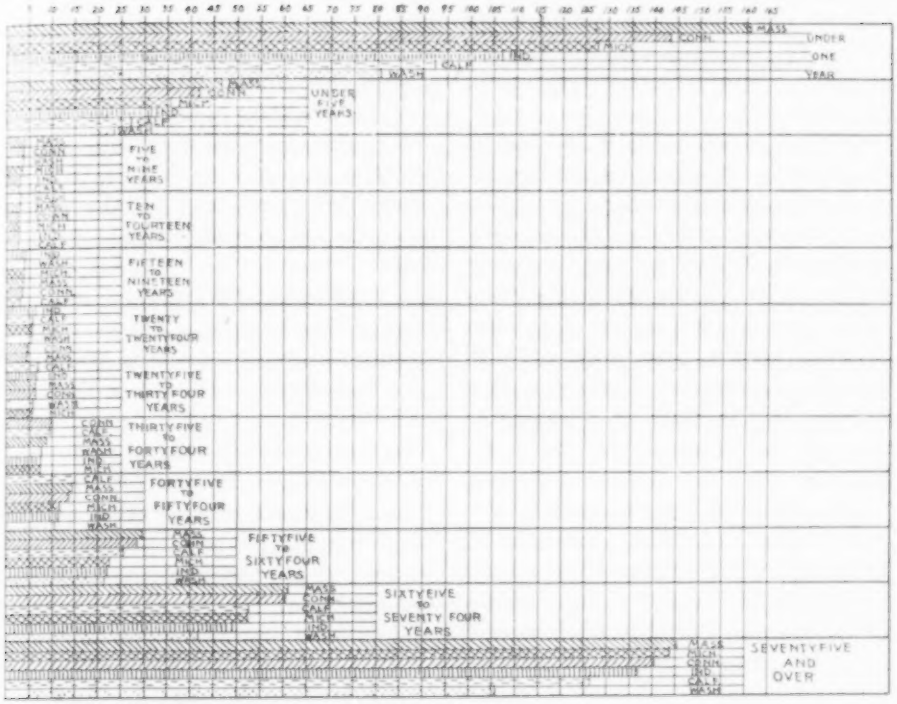
The reduction between the number of children under one year of age and that of those one year of age, can be accounted for only on the supposition that they died. Immigration and emigration cannot be taken into consideration on account of the fact that the variation is general throughout the United States.

The reduction in Connecticut being 13.8 per cent. and that in Washington being 4.4 per cent., the death-rate in Washington in infants under one year of age should be one-third that of Connecticut. As a matter of fact, our death returns show that our infant mortality is just about one-half that of Connecticut or Massachusetts.

Further evidence of the low death-rate in Washington and where and why. Please turn to Chart 7. In this chart I have used the same design to represent each state in the various age periods. Please note how Washington changes her relative position from the lowest in the periods under 5 years of age to that of not infrequently the highest between the ages of 5 and 50 years. These are the ages in which we have the greatest proportion of our population. Our death-rate in these ages is not a low one as compared to that of other states. However, this is a period of low death-rates in every locality. In the periods over 60, our death-rate is low.

I am thoroughly convinced that the death returns in Washington are complete. If our population is overestimated, then our death-rate as given by the United States Census Bureau is unduly low. But even with a reduced population estimate, we still show a death-rate of under 9.0. Is

CHART 7.


UNDER ONE YEAR
UNDER FIVE YEARS
FIVE TO NINE YEARS
TEN TO FOURTEEN YEARS
FIFTEEN TO NINETEEN YEARS
TWENTY TO TWENTY FOUR YEARS
TWENTY FIVE TO THIRTY FOUR YEARS
THIRTY FIVE TO FORTY FOUR YEARS
FORTY FIVE TO FIFTY FOUR YEARS
FIFTY FIVE TO SIXTY FOUR YEARS
SIXTY FIVE TO SEVENTY FOUR YEARS
SEVENTY FIVE AND OVER

Deaths in 1910 from All Causes Per 1,000 Population of Given Ages.

this probable? I maintain that it is entirely reasonable and probable.

We note that in 1910, Massachusetts showed a death-rate of 16.6, and Connecticut a death-rate of 15.6, that Indiana showed a death-rate of 13.5 and Michigan a death-rate of 13.6. In other words, Michigan and Indiana showed a death-rate of approximately 3.0 per thousand less than Massachusetts or Connecticut. These death-rates are claimed as right and proper and the difference is acknowledged on the ground that a younger state, on account of the sparsely settled conditions, the lack of city slums, and on account of the average age of the population, will naturally show a lower death-rate than the older states.

If Michigan and Indiana, for these reasons, show a death-rate of 3.0 per thousand less than Massachusetts or Connecticut, what would be a just and proper death-rate for Minnesota or Missouri based on the same line of argument and what would be a proper death-rate for younger states of the Rocky Mountain district?

I maintain that a death-rate of less than 10.0 per thousand is perfectly

reasonable in the young states and especially the states of the Pacific Coast. Our climatic conditions are especially favorable to the prolongation of the lives in the very young and very old.

A study recently made for me by Dr. Louis I. Dublin of the Metropolitan Life Insurance Company relative to deaths among holders of Industrial Insurance Policies in his company, which study will appear in the Eleventh Biennial Report of the State Board of Health, now in press, shows that the death-rate of these policyholders in the state of Washington was 6.6 per thousand for the period 1913 to 1915, as against a general death-rate of 10.8 per thousand.

In regard to infant mortality I quote Dr. C. L. Wilbur: "The chief difference, as I note, in the character of Washington mortality is the exceedingly low rate of deaths of children under 5 years of age and of infant mortality and the low rate of decedents 75 years and over. These low rates, I believe to represent facts, namely, that the infant mortality of Washington is exceedingly low because of the absence of the hot summers, cold winters, and other conditions leading to the spread of infectious diseases of children—undue prevalence of infantile enteritis, etc. There is an entire absence of slums and the crowded conditions of life incident thereto in the cities of the state, abundance of food, and conditions under which daily outdoor exercise and air are available for children. So that the low rate of infantile mortality and the consequent low death-rate of children under 5 years of age and also of older children, seems entirely reasonable under climatic and building conditions very similar to those which have produced the exceedingly low rates in New Zealand for this class of population."

The death-rate for the age period 10 to 34 in the state of Washington exceeds the death-rates for the corresponding age periods in England and Wales. For the age period 5 to 34, the death-rate in Washington exceeds that of New Zealand. The death-rate in the age period 45 to 74 in Washington, corresponds with that in England and Wales.

We believe then that a death-rate of 9.0 or less, in Washington, Oregon, Utah, Montana or any other of our very young states, and especially those located where the favorable climatic conditions in the Rocky Mountain and Pacific Coast States prevail, is not unreasonable, but on the contrary, if one of these states does not hold her death-rate at or below 10.0 per thousand population, she is justly entitled to condemnation for failure to take proper precautions to protect the health and lives of her people.

There is one portion of Washington, and the same condition prevails in practically all of our Western states, from which we do not receive proper death returns. I refer to those portions under federal government, namely, Indian reservations, forest reservations, military reservations, etc. Our state law does not extend over these districts, and yet the population thereon is included in the population of our state. In Washington

the death returns from Indian reservations are gradually improving, but it does appear to me, as a worker in the field, that our federal government should see that every death and every birth that occurs on any reservation whatever, under federal supervision, is promptly and properly recorded with the registrar of births and deaths in the state in which such reservation is located.

As a result of this study I submit:

First. The registration of deaths in the state of Washington is as complete as that in most, if not in any, of the states in the registration area.

Second. The low infant mortality in Pacific Coast states is an absolute fact and not a hallucination of overzealous health officers.

Third. A mortality of less than 10.0 in a young state is entirely right and proper and when the mortality exceeds 10.0 in our young states, investigation as to the precautions taken for the preservation of the health and lives in such states is entirely in order.

Fourth. That some method should be devised by the United States Census Bureau whereby reasonably accurate estimates of population may be made in sporadically growing states.

TABLE I.

Registration States.	Pop. in 1908 as estimated by U. S. Census Bureau from 1910 census.	Pop. in 1908 as estimated by U. S. Census Bureau in 1908.	Variation.
California	2,215,618	1,702,377	513,241
Colorado	751,973	640,861	111,112
Connecticut	1,077,319	1,038,149	39,170
Indiana	2,667,417	2,775,711	108,294
Maine	733,678	721,170	12,508
Maryland	1,275,878	1,304,566	28,688
Massachusetts	3,235,343	3,122,680	112,663
Michigan	2,724,734	2,639,050	85,684
New Hampshire	427,126	439,634	12,508
New Jersey	2,392,721	2,300,427	92,294
New York	8,729,074	8,546,356	182,718
Pennsylvania	7,417,816	7,137,315	280,501
Rhode Island	519,628	510,997	8,631
South Dakota	538,150	487,354	50,796
Vermont	353,721	352,617	1,104
Washington	1,028,794	646,799	381,995
Wisconsin	2,295,392	2,324,892	29,500
	38,384,382	36,690,955	1,872,417
			178,990
		Total variation	2,051,407
		Apparent variation	1,693,427

TABLE I-A

DEATH-RATES PER 1,000 POPULATION, BASED ON POPULATION AS ESTIMATED FROM 1900 FORWARD, AND 1910 BACKWARD.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
Boston	20.4	19.7	18.9	17.9	18.3	18.5	18.9	19.2	19.1
	20.4	19.9	19.1	18.3	18.3	18.5	18.6	18.6	18.3
Detroit	16.3	15.3	15.6	15.8	14.9	14.4	17.0	16.5	15.6
	16.3	15.3	15.6	15.8	14.9	13.8	15.7	14.9	13.7
Portland	10.2	12.4	11.7	12.7	13.5	13.7	13.5	16.5	15.3
	10.2	11.3	10.0	10.2	10.3	9.7	9.4	11.0	9.9
Richmond	29.0	24.6	25.5	25.4	24.0	22.1	23.0	25.0	23.1
	29.0	24.2	24.9	24.5	22.9	20.9	21.5	23.4	21.7
Seattle	11.1	10.8	12.3	12.1	12.6	11.5	12.7	15.7	....
	11.1	9.7	10.2	9.5	9.3	8.1	8.5	10.8	9.3
Indianapolis	17.1	15.4	14.3	15.8	16.4	14.1	14.6	15.2	13.5
	17.1	15.4	14.1	16.0	16.7	14.6	15.1	15.8	14.2

TABLE II.

SHOWING DEATH-RATES BY AGES PER 100,000 POPULATION.

	Under 1.	1-9.	10-19.	20-29.	30-39.	40-49.	50-59.	60-69.	70-79.	80-89.	90 and over.
Washington	161	89	57	127	109	104	108	109	88	41	5
California	156	243	46	125	147	158	162	197	293*	..	..
Indiana	221	128	60	109	98	107	121	174	202	105	14
Michigan	280	409	50	101	91	102	130	180	307*	..	..
Massachusetts	338	488	49	99	122	137	163	212	339*	..	..
Connecticut	310	142	51	92	123	131	152	207	213	117	18

* Estimation in these states stopped at 70 instead of carrying it on to 90 and over.

TABLE III.

POPULATION IN VARIOUS AGES PER 100,000 TOTAL POPULATION.

	Under 1	1-9.	10-19.	20-29.	30-39.	40-49.	50-59.	60-69.	70-79.	80-89	90 and over.
Indiana	2,077	17,933	19,057	17,801	14,330	11,441	8,673	5,402	2,475	599	45
Connecticut	2,170	17,002	17,609	18,837	15,951	12,152	7,974	4,988	2,463	667	60
Washington	1,932	16,318	16,852	21,737	17,244	12,458	7,537	3,566	1,425	302	22

TABLE IV.

SHOWING POPULATION FOR EACH YEAR FROM 1900 TO 1913 AS ESTIMATED BY THE CENSUS BUREAU AND AS DETERMINED FROM DEATH RETURNS.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
CALIFORNIA.														
Estimated from 1900	....	....	....	....	....	....	1,648,044	1,675,211	1,702,377	....	....	....	....	....
Estimated from 1910	....	....	....	....	....	....	2,034,859	2,125,238	2,215,618	2,305,998	2,396,378	2,486,757	2,577,137	2,667,516
Based on death returns	....	....	....	....	....	....	2,029,954	2,217,899	2,242,009	2,219,908	2,314,520	2,470,593	2,704,656	2,830,958
MICHIGAN.														
Estimated from 1900	2,420,982	2,448,240	2,475,498	2,502,757	2,530,061	2,557,275	2,584,453	2,611,790	2,639,050	....	....	....	....	....
Estimated from 1910	2,420,982	2,448,240	2,475,498	2,502,757	2,533,990	2,581,676	2,629,362	2,677,048	2,724,734	2,772,421	2,820,108	2,867,794	2,897,207	2,910,570
Based on death returns	2,451,050	2,455,525	2,357,351	2,449,315	2,599,369	2,600,913	2,700,821	2,794,520	2,730,228	2,736,064	3,009,862	2,916,429	3,021,598	3,137,534
MASSACHUSETTS.														
Estimated from 1900	2,805,346	2,861,986	2,918,626	2,973,266	3,031,906	3,003,680	3,043,346	3,083,013	3,122,680	....	....	....	....	....
Estimated from 1910	2,805,346	2,845,012	2,884,679	2,924,346	2,964,013	3,015,873	3,089,029	3,162,186	3,235,343	2,308,500	2,381,657	3,454,813	3,491,888	3,548,705
Based on death returns	2,970,312	2,886,918	2,869,513	2,950,781	2,952,343	3,069,531	3,058,593	3,333,046	3,134,687	3,141,093	3,328,906	3,271,799	3,294,375	3,365,156
WASHINGTON.														
Estimated from 1900	....	....	....	....	....	....	....	....	646,799	....	....	....	....	....
Estimated from 1910	....	....	....	....	....	....	....	....	1,028,794	1,091,973	1,155,152	1,218,330	1,281,508	1,344,686
Based on death returns	....	....	....	....	....	....	....	....	962,692	1,059,500	1,156,539	1,117,308	1,085,256	1,210,384
CONNECTICUT.														
Estimated from 1900	908,420	924,636	940,852	957,067	973,284	989,500	1,005,716	1,021,933	1,038,149	....	....	....	....	....
Estimated from 1910	908,420	931,055	951,949	972,844	993,739	1,014,634	1,035,529	1,056,484	1,077,319	1,098,214	1,119,109	1,140,005	1,160,898	1,181,993
Based on death returns	927,546	937,082	905,705	977,098	1,001,711	1,044,172	1,066,177	1,124,531	1,032,762	1,059,250	1,128,361	1,156,071	1,140,994	1,175,550
INDIANA.														
Estimated from 1900	2,516,462	2,548,868	2,581,274	2,613,680	2,646,086	2,678,492	2,710,808	2,743,305	2,775,711	....	....	....	....	....
Estimated from 1910	2,516,462	2,536,692	2,555,367	2,574,042	2,592,717	2,611,392	2,630,067	2,648,742	2,667,417	2,696,092	2,704,767	2,723,441	2,742,114	2,760,792
Based on death returns	2,571,789	2,685,439	2,517,593	2,413,650	2,733,367	2,673,418	2,604,347	2,663,700	2,619,212	2,651,769	2,756,319	2,779,272	2,883,215	2,884,539

TABLE V.

SHOWING POPULATIONS AS ESTIMATED FROM 1900 FORWARD TO 1908, BACKWARD AND FORWARD FROM 1910 AND AS DETERMINED FROM THE DEATH RETURNS.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
BOSTON.														
Estimated from 1900	560,892	572,134	583,376	594,618	605,860	595,380	602,278	609,175	616,072	....	....	....	....	....
Estimated from 1910	560,892	567,789	574,686	581,584	588,482	597,908	613,075	628,242	643,409	658,576	673,744	688,911	711,128	722,465
Based on death returns	569,290	581,638	588,653	568,085	576,035	598,865	607,376	675,178	630,780	609,645	642,482	661,773	655,944	680,000
DETROIT.														
Estimated from 1900	285,704	293,676	301,647	309,619	317,501	325,563	353,535	367,494	376,174	....	....	....	....	....
Estimated from 1910	284,704	293,676	301,647	309,619	319,332	340,224	381,116	407,439	428,332	449,225	470,118	493,040	503,445	520,586
Based on death returns	305,254	302,627	304,745	324,491	313,644	319,407	390,339	415,583	401,017	428,305	495,255	481,356	528,365	599,068
INDIANAPOLIS.														
Estimated from 1900	169,164	175,537	186,410	197,555	204,622	212,198	219,154	227,698	234,994	....	....	....	....	....
Estimated from 1910	169,607	174,928	180,249	194,870	200,191	206,013	211,335	218,246	223,813	229,135	234,759	240,080	246,928	253,668
Based on death returns	186,864	182,881	177,711	203,983	218,812	203,559	205,932	216,525	200,593	213,305	249,654	237,966	255,254	264,915
PORTLAND.														
Estimated from 1900	90,426	93,169	95,912	98,655	101,398	104,141	109,884	112,757	Not Estimated					
Estimated from 1910	91,301	101,811	112,321	122,831	133,341	146,851	157,361	168,871	179,382	190,893	209,404	219,915	234,546	246,569
Based on death returns	87,901	113,580	109,506	123,333	137,777	142,222	145,555	184,320	178,864	184,765	231,358	245,185	230,123	253,580
RICHMOND.														
Estimated from 1900	85,050	85,416	85,782	86,148	86,514	86,880	87,246	106,227*	107,844	....	....	....	....	....
Estimated from 1910	85,164	86,540	87,916	89,292	90,668	92,044	93,421	113,413	114,790	116,167	127,914	129,290	131,453	133,185
Based on death returns	104,480	91,474	92,378	88,541	87,103	82,256	82,185	113,413	108,579	104,535	124,371	114,644	121,256	122,891
SEATTLE.														
Estimated from 1900	80,671	84,454	88,237	92,020	95,803	99,586	Not Estimated, See Note †							
Estimated from 1910	80,671	93,673	105,675	117,677	129,679	141,681	154,483	188,485	210,488	222,491	239,694	252,782	277,420	295,226
Based on death returns	95,000	91,579	116,579	116,052	120,131	117,500	137,763	212,894	204,868	230,263	253,947	233,026	248,289	269,868

* Apparently there was a new basis of estimation used for Richmond in 1907 and 1908 which variation was used in estimating both from 1900 and 1910.

† In the census reports for 1906 and 1907 it is noted that the population of Seattle is not estimated. However, on page 134 of the 1906 report we find that the death-rate for Seattle is placed at 12.7 and on page 150 of the 1907 report we find that the death-rate is placed at 15.7. It must be assumed that these are arbitrary death-rates as not only is it specified that the population was not estimated but had the same rate of increase been continued as used from 1900 to 1905 the death-rates for 1906 and 1907 respectively would be 14.5 and 19.0.

TABLE VI.

POPULATION IN CERTAIN AGES PER 100,000 TOTAL POPULATION AND PER CENT. OF DECREASE BETWEEN UNDER ONE AND ONE YEAR OF AGE IN 1910.

	Under 1.	1 year.	2 years.	3 years.	4 years.	Per cent. decrease from under 1 to 1 year of age.
Michigan	2,208	2,013	2,163	2,137	2,101	8.8
Connecticut	2,170	1,868	2,071	2,026	1,932	13.8
Massachusetts	2,101	1,846	2,006	1,974	1,840	12.1
Indiana	2,077	1,901	2,070	2,071	2,078	8.8
Washington	1,933	1,846	1,929	1,936	1,876	4.4
California	1,696	1,539	1,685	1,655	1,569	9.3

TABLE VII.

SHOWING DEATHS PER 100,000 TOTAL POPULATION IN FIRST FIVE YEARS.

	Under 1.	1 year.	2 years.	3 years.	4 years.
Washington	163	29	13	10	7
California	156	31	15	10	7
Indiana	222	53	24	13	10
Michigan	281	49	22	14	10
Massachusetts	338	64	24	17	11
Connecticut	312	55	25	16	12

TABLE IX.

PER CENT. OF DEATHS FROM PREVENTABLE DISEASES OF DEATHS FROM ALL CAUSES.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	Aver.	1910.	1911.	1912.	1913.
Connecticut	24.4	22.6	22.7	22.6	22.2	21.3	21.9	21.0	20.7	21.2	22.1	20.9	19.2	19.1	18.6
Indiana	25.9	24.4	25.9	25.0	24.5	23.1	23.7	23.1	23.5	24.0	24.3	25.2	21.9	20.2	22.2
Massachusetts	25.6	23.3	22.6	22.7	21.9	21.9	22.3	20.8	22.1	21.3	22.5	21.5	20.9	19.2	19.0
Michigan	20.9	18.1	18.3	19.0	17.2	17.5	19.8	15.9	18.1	17.3	18.2	17.8	15.9	14.6	15.8
California	....	....	....	....	....	....	22.5	21.8	21.4	21.4	21.8	22.0	20.4	19.3	19.7
Washington	....	....	....	....	....	....	....	....	21.5	22.8	....	21.5	19.6	16.8	17.1

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PREVENTION AND CURE OF VENEREAL DISEASES.

The history of the progress of medical knowledge and of ethical views with regard to venereal diseases illustrates not only an increasing appreciation of the individual's responsibility to himself, but also a growing conscience in him with regard to protecting others from the dangers of which he may be the direct agent. This growing sense of responsibility to the public was illustrated as long ago in England as 1866 when the "Contagious Diseases Act" was repealed and licensed immorality was condemned by the public conscience as being inexcusable and not to be condoned. The advance in our scientific knowledge of these diseases both as regards their causes and their prevention and cure has made the education of public opinion both easy and rapid as to what might be and ought to be done to lessen or prevent evils, whether physical or mental, growing directly out of these diseases or transmitted indirectly through heredity to later generations.

In a recent lecture by Dr. C. T. Macallister of Liverpool, before the Royal Institute of Public Health expression was given in the address and discussion after it to the various attitudes of medical opinion in Great Britain with regard to these diseases. Doctor Macallister thought "compulsory notification would be inadvisable at the present moment; it would be time for this when education had done its work and the quack had been cleared away." Dr. F. W. Mott spoke of the comparative efficacy of prophylactic treatment; while its value was urged by Dr. Otto May as a matter to be considered *in se* and wholly apart from the ethical question of prevention through self-control. One of the first medical officers of health, Dr. H. R. Kenwood insisted that so soon as the routine of official notification of cases had been provided for and the Regulations of the Local Government Board under the recent Imperial Act put in force its provisions for preventing chemists and quack practice must be rigidly enforced.

The Local Government Board Regulations provide for arrangements to be made by all borough and county Boards of Health with hospitals within their areas, for the establishment of free clinics and the appointment of selected clinicians, both to diagnose and administer some approved form of salvarsan. They provide further that all physicians must notify the local Board of Health under a registered number of every venereal case under their care, while if such desire it they can obtain the free administration of salvarsan for their patients by the official clinician of the district. The physician on notifying a case will receive literature with instructions for his patient with regard to his personal hygiene and which warn him of the penalties for exposing any person, while he is under treatment, to the danger of infection. The patient must further notify his physician or the local authorities of any change of his abode so that they may be assured that his treatment will be continued. Provision is even made for the free transport of sick persons to hospitals for free treatment if otherwise they would be unable to go. The Local Government Board provides that 75 per cent. of the total cost of all this will be borne by the Imperial Government and the balance by the municipalities.

This remarkably thorough organization for dealing with social diseases is the outcome of the report of the Royal Commission, which contains statistics and facts regarding the situation, full of interest and illustrative not more of the conservative way in which legislation is undertaken in Great Britain in matters affecting the liberty of the citizen than of the scientific and thorough manner in which legislation when once enacted is put in force. The elevated ideas along social lines which prevail in Parliament are well illustrated when they accept the findings of a scientific commission as a sufficient guide to them in passing legislation of so drastic a character as that in recent acts.

It is probably true that on the American continent similar legislation is more readily obtained when public agitation has been worked up than in England; but the practical difficulties in its enforcement are usually found not more in the refusal of the general public to submit to drastic regulations than in the extremely varied character of our administrative machinery. It is true that in most states and provinces local Boards of Health are appointed, while in probably all such the boards in cities and towns where hospitals are located have fairly adequate public health by-laws. What is, however, altogether too prevalent is the evil of temporary political appointments of health officers, with in consequence, tenures of office unfortunately very uncertain. If, however, state legislation of an adequate character, such as that recently passed in England, is effected with regulations for compulsory notification and scientific treatment of cases in hospital clinics, and if provisions are made for supervising the general hygiene and movements of patients until treatment is completed, then the first real steps in advance in the solution of this, the most difficult of all public health problems, will have been taken.

A STUDY OF THE APPLICATION OF THE SCORE SYSTEM TO THE SANITARY QUALITY OF PUBLIC WATER SUPPLIES IN NEW YORK STATE.

THEODORE HORTON, *Chief Engineer* and E. SHERMAN CHASE, *Assistant Engineer, New York State Department of Health.*

Read before the Sanitary Engineering Section of the American Public Health Association, Cincinnati, Ohio, October 25, 1916.

IN THE State of New York there are approximately 500 public water supplies, of which some 300 are from surface sources and some 200 from ground water sources. Although these supplies are only partially under the jurisdiction of the State Department of Health, this department has, however, always exercised a general supervision over them. It is only in the last 10 years, during which time the Engineering Division has been in existence, that particular attention has been paid to this supervision. During this period the physical and sanitary conditions of some 400 of the 500 supplies have been carefully investigated and reported upon. These investigations have included field inspections, gathering of local statistics, laboratory analyses and office studies and reports with recommendations for needed improvements.

With so large a number of supplies under supervision it was considered desirable, for many reasons, that some convenient method of rating the sanitary character of these supplies, according to some definite quantitative measure, should be worked out and our endeavor in this direction lead to the following study:

There are three factors or measures which may be considered as fundamental in rating the sanitary quality of a water supply, namely: Contamination on the water shed; natural agencies or artificial means tending to counteract or correct this contamination; and the efficacy of these agencies as determined by laboratory analyses.

In making this study it was found that the water supplies of New York State could be classified according to three groups, as follows:

Group (1) Surface water supplies, excluding supplies from the Great Lakes, the Niagara and St. Lawrence Rivers.

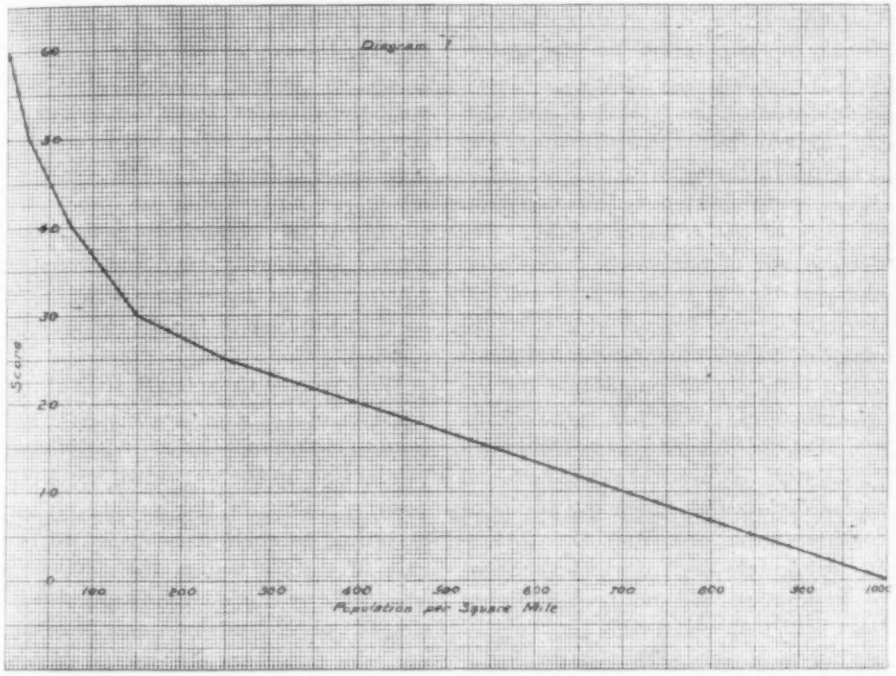
Group (2) Water supplies from the Great Lakes, the Niagara and St. Lawrence Rivers.

Group (3) Ground water supplies.

In each group, however, the same general formula was applied which was expressed as follows:

$S=A+B-C$, in which S is the "Score" representing the sanitary quality of the supply on a 100 per cent. scale; A, a factor representing the condition of pollution of the water shed; B, a factor representing natural or artificial means of purification or protection against pollution; C, a factor representing the efficiency of this purification in the nature of a penalty based on the prevalence of B. coli in the water as delivered.

In respect to the factor A, it is evident, in the case of surface water supplies, that the only rational measure of pollution is the resident population upon the watershed and that the intensity of this pollution should be considered as proportional to the density of population, due account being taken of whether the contamination is direct or indirect. For the purpose of this study, then, values have been assigned to water supplies from surface sources according to the density of population upon the watershed, these values ranging from a maximum of 60 for an unpopulated watershed down to 0 for a watershed with a population of 1,000 per square mile. In ascribing a population per square mile, allowance has been made for direct or indirect pollution by multiplying the population contributing directly (*i. e.* by direct sewage discharge) by 5 before selecting a figure to be used for the purpose of scoring. In other words the figures for population per square mile given in the appended tables do not represent the actual population but are made up of the resident population not discharging directly, *i. e.* indirect contamination, plus 5 times the population discharging sewage directly, the relative danger of the two being assumed in the ratio of 1 to 5. While the apparently low figure assigned to an unpopulated watershed may seem somewhat rigorous it must be recognized that an uninhabitated



watershed has been generally considered to be always subject to contamination of an accidental, incidental or wilful nature from chance visitors upon the watershed. The values for factor A have been plotted in a curve given in the appended Diagram No. 1.

In the case of the supplies from the Great Lakes and the Niagara and St. Lawrence Rivers it is evident that the density of population on the watershed is of practically little significance in determining the quality of the supply derived from these sources. The principal factor to be considered is the direct contamination within a certain distance of the point of intake. For the purpose of this study it has been assumed that a population of 100,000 discharging raw sewage at a distance of one mile from the intake corresponds to an intensity of population on the watershed of 1,000 per square mile and that the danger arising from such population is inversely proportional to the distance at which the points of contamination are from the intake. In the lakes the limit at which the effect of population will be negligible has been set at 20 miles, this limit agreeing fairly closely with the results of observations of pollution in the Great Lakes. In the case of the rivers all pollution entering the river and affecting the supply is taken into consideration. In the case of this whole group, after obtaining the equivalent population on the watershed, the curve used in the case of Group (1) is applied.

In the case of ground water supplies from wells the watershed has been considered as equivalent to the area of the base of the cone of depression tributary to the supply, this area having been restricted to that of a circle with a radius of 1,000 feet. In the case of spring supplies the watershed has been considered as being the surface watershed tributary to the point at which the spring is situated. These areas have been divided into three zones and the relative importance of sources of contamination upon these zones has been taken into consideration by multiplying the population in the different zones by factors varying inversely with the distance from the source of supply, before equating the figures for population in terms of density of population per square mile on the water shed. After obtaining comparable figures for density of population per square mile on the watershed the curve used in the case of Group (1) may be applied.

With respect to factor B, the natural agencies or artificial means which will tend to counteract the presence of contamination on the watershed are given positive values in the scoring system according to their reliability. In the case of surface waters the maximum score for any single method of purification is assigned to slow sand filtration and the minimum to storage of one week's duration. Storage, in the case of surface waters has not been given a high rating because of the continued presence of uncertainties with respect to the actual amount of storage, due to currents induced by wind and other causes. In case two or more methods of purification are employed the total score for purification has been considered as the sum of the scores of each method. No combination, however, to be credited with a score above 40.

With ground water supplies the pas-

sage of the water through the soil has been considered equivalent to purification and scores have been arranged accordingly, the scores ranging from a maximum of 40 for wells or springs situated in sand to a minimum of 20 for those situated in solvent rock.

Considering factor C, it may be explained that without proper control of the efficiency of operation even the best method of safeguarding the sanitary quality of the supply would be practically useless. The only way that seemed available and at the same time rational for measuring this control was through the use of bacteriological analyses applied as a penalizing factor in the score. To accomplish this minus values have been assigned and deductions made according to the relative presence of B. coli in the samples of the water. With ground water supplies the penalty for bacteriological results has been doubled on account of the greater significance of bacterial analyses as an indication of the sanitary quality of underground waters.

The following is a summary of the method of scoring which has been tentatively adopted in this study:

METHOD FOR SCORING WATER SUPPLIES.

General formula: S = A + B − C.
Where S = Score
A = Condition of pollution of the watershed.
B = Methods of protection or purification.
C = Penalty based upon B. coli results.

CASE I. SURFACE WATER SUPPLIES.

Factor A. Values for this factor are to be taken from the curve of population per square mile, the values ranging from 60 for an unpopulated watershed to 0 for a population of 1,000 per square mile. The figure for population per square mile in this case is to be made up of the sum of the population contributing sewage directly and indirectly, the population contributing directly being first multiplied by 5.

Factor B. Values for this factor will depend upon the means of purification, as follows:

Slow sand filters	20
Sterilization	15
Gravity mechanical filters	15
Pressure mechanical filters	10
Storage (2 wks.)	10
Storage (1 wk.)	5

For combined methods of purification add individual scores but allow no greater than 40.

Deduct 5 in case no coagulant is used with mechanical filters.

Factor C. Penalty for B. coli results deduct one-tenth the sum of:

Per cent. of samples with B. coli present in 10 c.c.
Per cent. of samples with B. coli present in 1 c.c.
Per cent. of samples with B. coli present in $^1/_{10}$ c.c.

CASE II. GREAT LAKES SUPPLIES, NIAGARA AND ST. LAWRENCE RIVERS.

Factor A. In assigning values for this factor, consider that a population of 100,000 discharging sewage into the body of water within 1 mile of the intake is equivalent to a population of 1,000 per square mile and that the danger from such pollution is inversely proportional to the distance beyond 1 mile. In case of the lake supplies consider also that the limits at which pollution will affect the supply is 20 miles. In the case of the rivers all

pollution reaching river and affecting the supply is to be considered.

The equivalent population per square mile will then equal $\frac{P}{100 \times D}$ in which

P = Population discharging sewage.

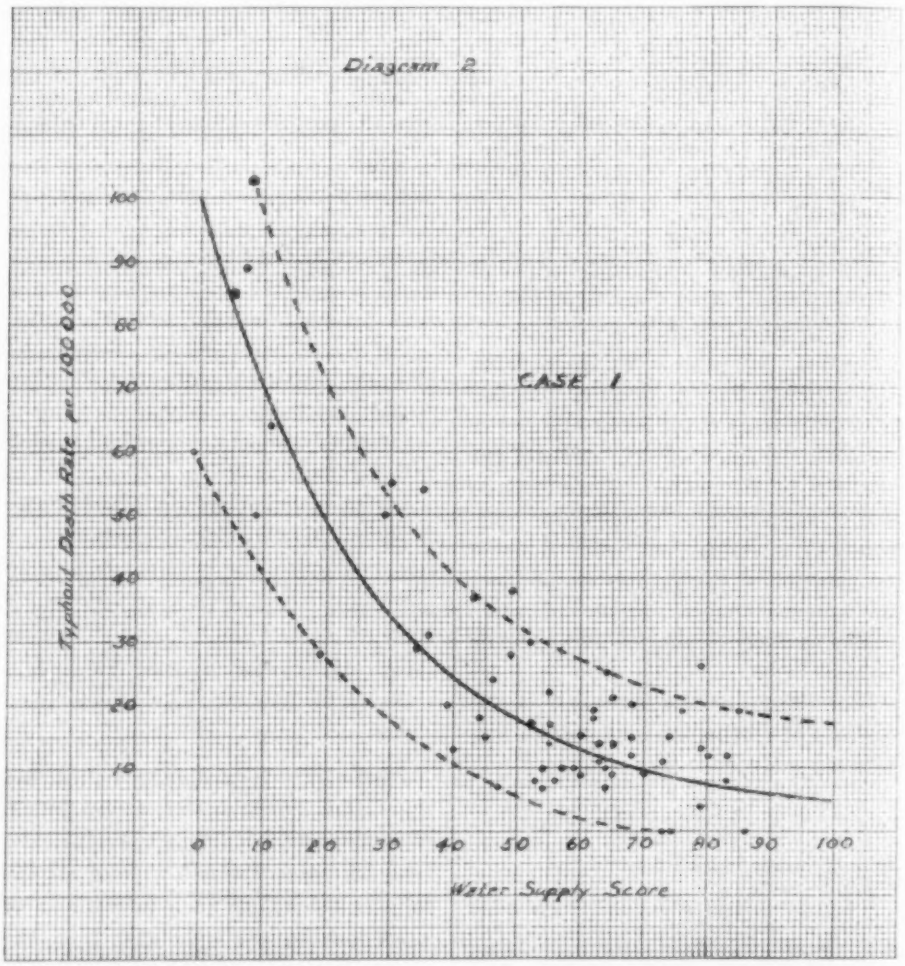
D = Distance from intake in miles.

Factor B. Purification was with Case I.

Factor C. Analytical Penalty as with Case I.

CASE III. GROUND WATER SUPPLIES.

Factor A. In assigning values for this factor each source of pollution within 100 feet is to be considered equivalent to a population of 20 per square mile; beyond 100 feet and within 500 feet, equivalent to 10 per square mile; and beyond 500 feet and within 1,000 feet equivalent to 5 per square mile. Use curve for Case I in determining Factor A.



Factor B. The value for this factor will depend upon the natural character of the material in which the springs or wells are located, as follows:

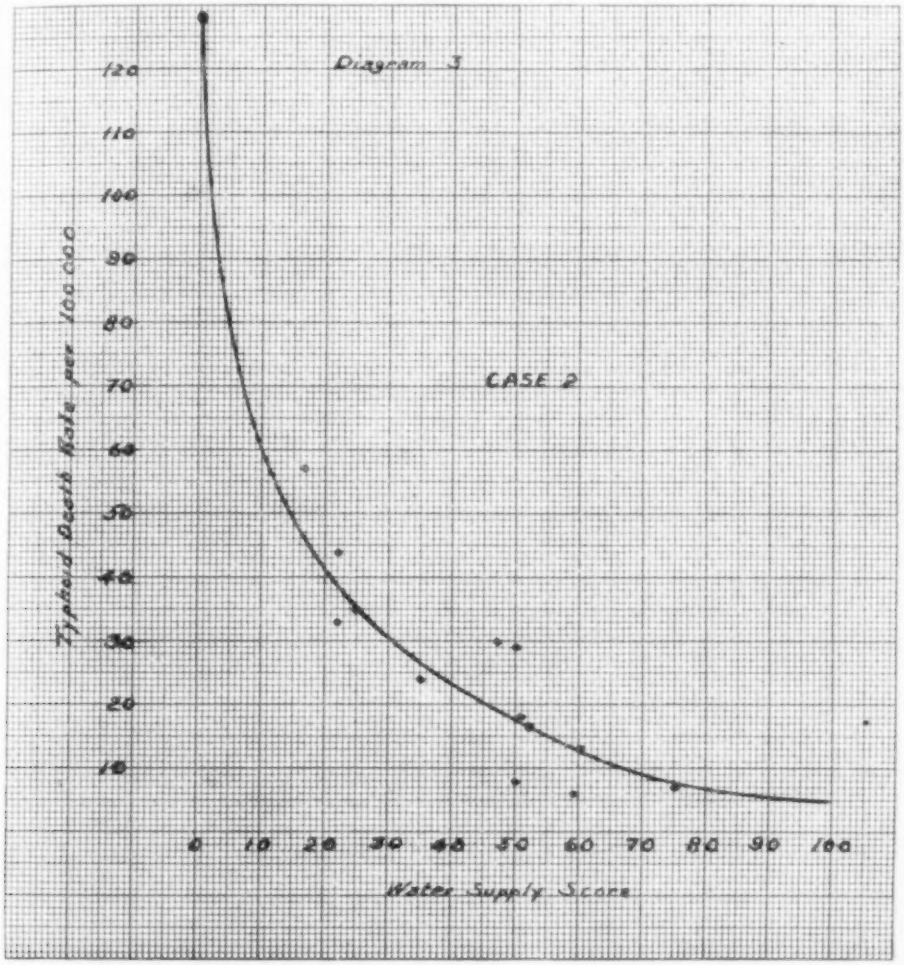
Sand	40
Loam	35
Clay	30
Fissured Rock and Gravel	25
Solvent Rock	20

If artificial means of purification are used, assign values as for Case I.

Factor C. Penalty for B. coli results.

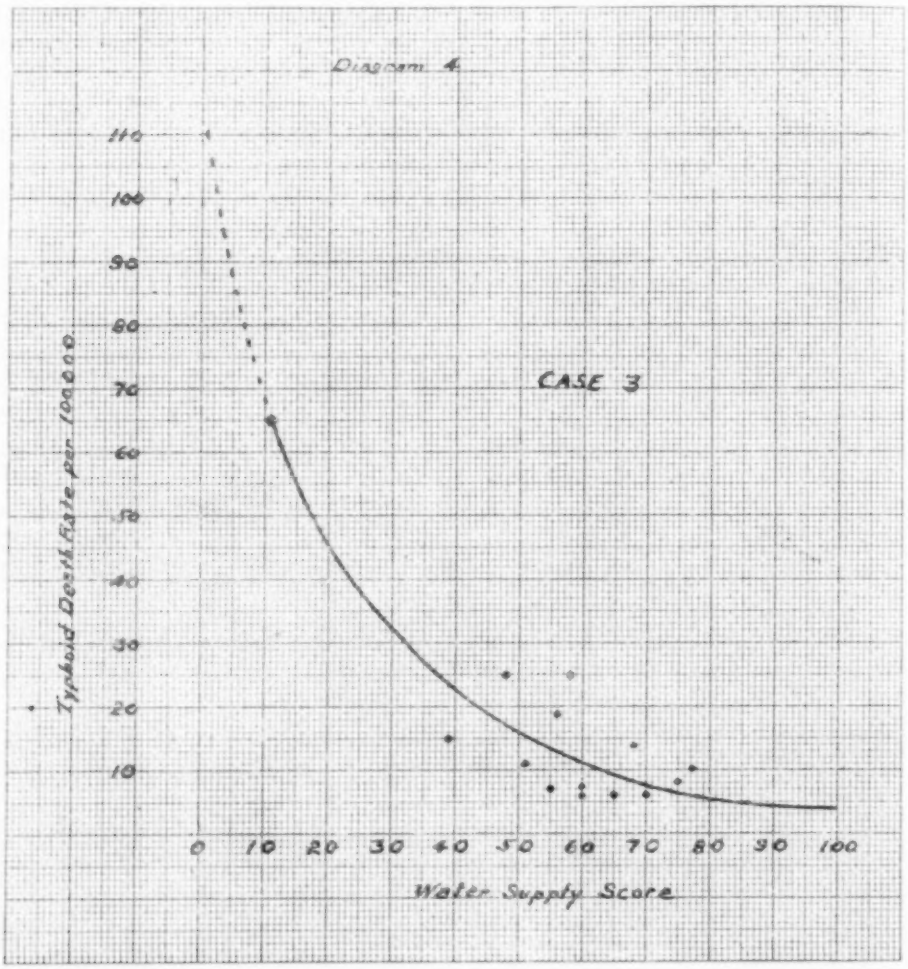
Double that of Case I.

The results of the scoring of some 90 public water supplies in New York State are given in the appended table,



together with the typhoid fever death-rates for the municipalities served by these supplies. In some cases two scores are given for the same municipality owing to the fact that information

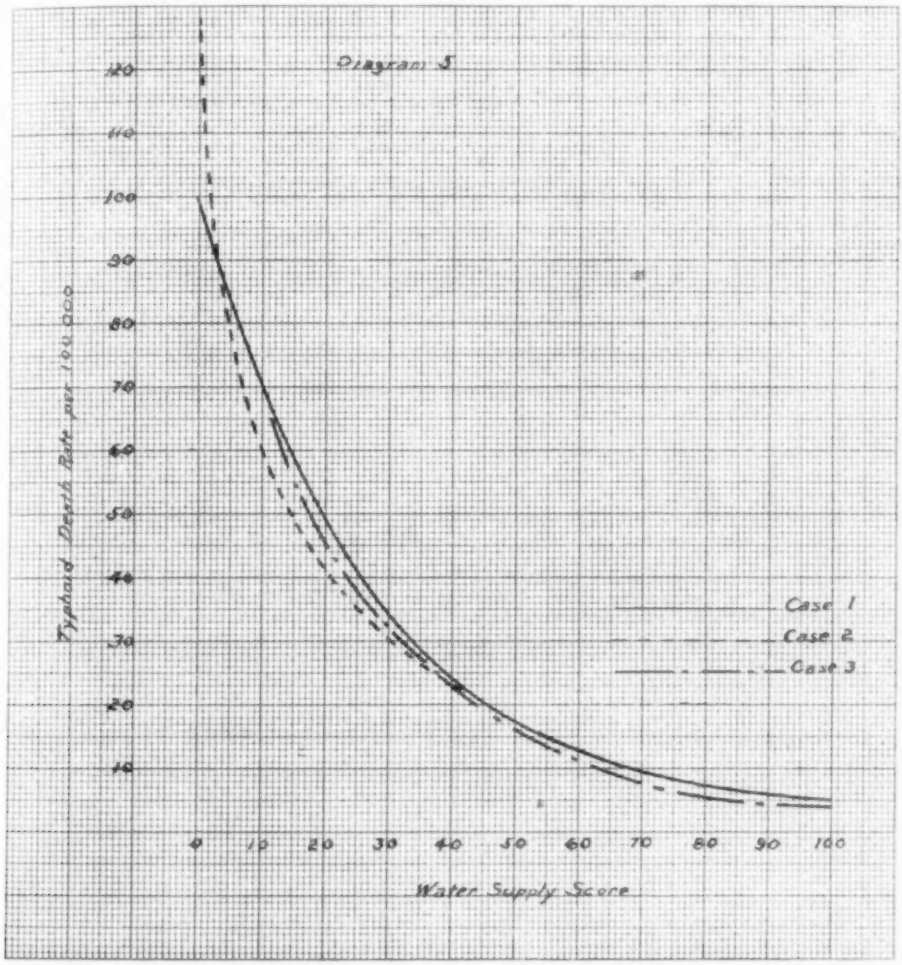
was available regarding the supply before and after changes or improvements. In such cases, however, the typhoid rates are those for the years in which the supplies were in the condition scored. The supplies scored include only those for municipalities of 5,000 population or upwards, although it is intended to score all of the remaining supplies in New York State.



The tabulated results have been plotted in curves, also appended, which show more strikingly the relation between the scores and the typhoid fever death-rates as well as the applicability of the score system. The curves for the scores of the three groups of supplies were plotted independently and are shown in diagrams 2, 3, and 4. After these three curves were plotted they were superimposed with the result shown in diagram 5. The practical coincidence of the three curves indicates the approximate correctness of the values assigned for the various

factors used in the general formula for scoring.

In conclusion it should be stated that the foregoing study for a score system of the sanitary quality of public water supplies is presented as tentative only and that the figures assigned for the different factors are, for the time being, merely suggestions. The scores actually obtained, however, correspond in a general way so closely with our knowledge of the sanitary qualities of the supplies secured through field investigations and compare so closely with the typhoid fever death-rates, as to convince us of the practicability of the application of the score system to the water supplies of New York State. A continuation of our studies in connection with this score system, will no doubt enable us to make such modifications in the values of the several factors as to make the final scores even more consistent with our knowledge of the quality of the supplies and the corresponding typhoid fever death-rates.



SCORES OF WATER SUPPLIES OF MUNICIPALITIES IN NEW YORK STATE WITH POPULATIONS OF 5,000 OR OVER.

CASE I.

Place.	Pop. per sq. m.	A.	Treatment.	B.	Per cent. samples with B. coli present.			C.	Final score.	Typhoid rate.
					10 cc.	1 cc.	1/10 cc.			
Albany	280	24	G. F. & S. F., Ster.	40	0	0	0	0	64	12
Albany, Before 1900	190	28	None	0	*100	*100	0	20	8	89
Albion	47	46	Stor., G. F., Ster.	40	0	0	0	0	86	0
Amsterdam	0	60	Stor.	10	70	0	0	7	63	11
Auburn	51	45	Stor., Ster.	†.10	0	0	0	0	65	14
Batavia	44	46	None	0	100	100	60	26	20	28
Beacon	33	49	None	0	90 (100)	50 (40)	0	14	35	29
Binghamton	75	40	G. F., Ster.	30	17	0	0	2	68	12
Binghamton, Before 1902	50	45	None	0	100	50	0	15	30	50
Canandaigua	38	48	Stor.	10	25	0	0	3	55	22
Catskill	330	22	None	0	100	100	33	23	− 1	60
Cohoes	330	22	G. F., Ster.	30	20	0	0	2	50	28
Cohoes, Before 1911	220	26	None	0	100	*100	*0	20	6	85
Elmira	25	50	G. F., Ster.	30	0	0	0	0	80	12
Elmira, Before 1896	18	51	None	0	100	*50	*0	15	36	54
Fredonia	33	48	Stor.	10	90 (100)	70 (80)	20 (0)	18	40	20
Geneva	94	37	Stor., S. F.	30	70	0	0	7	60	15
Geneva, Before 1914	94	37	Stor.	10	100	*0	*0	10	37	31
Glens Falls	0	60	Stor.	10	80	0	0	8	62	18
Gloversville	15	54	Stor.	10	50	0	0	5	59	10
Haverstraw	20	51	Stor.	10	100	50	15	17	44	18
Hornell	45	46	P. F., Ster.	25	50	20	0	7	64	10
Hornell, Before 1900	45	46	None	25	*100	*50	0	15	31	55
Hudson	30	49	Stor., S. F., Ster.	40	80	20	0	10	79	26
Ilion	40	47	Stor., S. F.,	30	40	0	0	4	73	11
Ithaca	50	45	Stor., G. F., Ster.	40	0	0	0	0	85	19
Ithaca, Before 1903	50	45	None	0	*100	*50	0	15	30	35
Johnstown	1	59	Stor. (1 wk.)	5	80	30	0	11	53	8
Kingston	30	49	Stor., P. F., Ster.	35	7	0	0	1	83	8
Little Falls	10	56	Stor.	10	85	33	25	14	52	17

*Estimated.

†Two-thirds credit for intermittent sterilization.

CASE I. *Continued.*

Place.	Pop. per sq. m.	A.	Treatment.	B.	Per cent. samples with B. coli present.			C.	Final score.	Typhoid rate.
					10 cc.	1 cc.	1/10 cc.			
Middletown	5	58	Stor., G. F.	25	0	0	0	0	83	12
Mt. Vernon	150	30	Stor. F., Ster.	40	50	0	0	5	65	9
Newburgh	30	49	Stor., Ster.	25	0	0	0	0	74	15
Newburgh, Before 1914	30	49	Stor.	10	100	0	0	10	49	38
New Rochelle	70	41	Stor., Ster.	25	70	30	0	10	56	8
New York	67	41	Stor., Ster.	25	20	0	0	2	64	7
New York, Before 1913	67	41	Stor.	10	*50	*0	0	5	46	15
North Tarrytown	50	45	Stor., P. F., Ster.	35	50	20	0	7	73	0
Norwich	30	49	A. F. Ster.	25	40	0	0	4	70	9
Oneida	40	47	Stor.	10	100	0	0	10	47	7
Oneonta	10	56	P. F., Ster.	25	40	10	0	5	76	19
Ossining	45	46	Stor., Ster.	25	30	0	0	3	68	20
Peekskill	42	46	S. S. F.	20	60	0	0	6	60	9
Perry	100	37	Stor.	10	40	15	0	6	41	13
Plattsburgh	20	51	Stor. (1 wk.)	5	100	30	0	13	43	37
Port Chester	30	49	Stor., P. F.	20	60	10	0	7	62	18
Port Jervis	0	60	Stor.	10	50	0	0	5	65	21
Poughkeepsie	310	23	Ster., S. F., Ster.	40	0	0	0	0	63	14
Rensselaer	280	24	G. F., Ster.	30	0	0	0	0	54	7
Rensselaer, Before 1902	190	28	None	0	100	100	0	20	8	103
Rochester	32	49	Stor.	10	20	0	0	2	57	10
Rome	10	56	Stor.	10	80	30	0	11	55	17
Saratoga	31	49	Stor.	10	50	10	0	6	53	30
Seneca Falls	31	49	Stor., P. F.	25	0	0	0	0	74	0
Syracuse	40	47	Stor.	10	20	0	0	2	55	14
Tarrytown	165	29	Ster., Stor., P. F., Ster.	40	50	0	0	5	64	25
Troy	30	49	Stor.	10	100	30	0	13	46	24
Utica	10	56	Stor., Ster.	25	20	0	0	2	79	4
Watertown	20	51	G. F., Ster.	30	20	0	0	2	79	13
Watervliet	350	21	S. F.†	13	100	100	50	25	9	50
White Plains	1	59	Stor.	10	10	0	0	1	68	15
Yonkers	208	27	S. F., Ster.	35	20	0	0	2	60 } 54	10
	40	47	Stor.	10	100	0	0	10	47 }	

* Estimated.

† Two-thirds credit for intermittent operation.

Case II.

Place.	Pop. per sq. m.	A.	Treatment.	B.	Per cent. samples with B. coli present.			C.	Final score.	Typhoid rate.
					10 cc.	1 cc.	1/10 cc.			
Buffalo	50	45	Ster.	15	0	0	0	0	60	13
Buffalo, Before 1913	50	45	None	0	100	0	0	10	35	24
Dunkirk	100	37	Ster.	15	0	0	0	0	52	17
Dunkirk, Before 1915	100	37	None	0	70	40	10	12	25	35
Lackawanna	35	47	Ster.	15	33	0	0	3	59	6
Lockport	100	37	Ster.	15	20	0	0	2	50	8
Lockport, Before 1914	100	37	None	0	90	50	10	15	22	33
Niagara Falls	275	25	G. F., Ster.	30	50	0	0	5	50	29
Niagara Falls, Before 1911	275	25	None	0	100	100	50	25	0	128
N. Tonawanda	100	37	Ster.	15	50	0	0	5	47	30
N. Tonawanda, Before 1915	100	37	None	0	100	100	0	20	17	57
Ogdensburg	10	55	S. F.	20	0	0	0	0	75	7
Oswego	100	37	Ster.	15	20	0	0	2	51	18
Tonawanda	100	37	None	0	100	50	0	15	22	44

Case III.

Corning	80	39	Well in gravel	25	30	0	0	6	58	25
Cortland	70	41	Well in gravel	25	30	20	0	10	56	19
Fulton	90	38	Gravel	25	50	25	0	15	48	25
Glen Cove	150	30	Sand	40	50	0	0	10	60	6
Hicksville	155	30	Sand	40	0	0	0	0	70	6
Huntington	100	37	Sand	40	0	0	0	0	77	10
Jamestown	115	35	Gravel	25	10	0	0	2	68	14
Johnson City	170	29	Gravel	25	50	20	0	15	39	15
Medina	35	48	Limestone	20	35	5	0	8	60	7
Newark	70	41	Loam	35	100	0	0	20	56	7
Olean	75	40	Gravel	25	15	5	0	4	51	11
Sea Cliff	115	35	Sand	40	50	0	0	10	65	6
Walden	375	21	Fiss. Rock	25	50	0	0	10	11	65
Schenectady	25	50	Gravel	25	0	0	0	0	75	8

BACILLUS COLI IN MILK—A PRELIMINARY REPORT.

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City Bacteriologist and Pathologist, St. Louis, Mo.

Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y., September 9, 1915.*

DURING the summer months of 1914 a controversy arose as to the presence or absence of B. coli in the municipal water of St. Louis. At this time one department was using the methods which they had been using for several years previously and another department was using different methods. The results differed. Eventually the controversy was settled but during this time the study of the literature showed that there had been many standards of isolating this group and that some of these methods differed distinctly from others. With these facts in view, the author of this work attempted a correlation, as it were, of the different methods, with the idea of either harmonizing or possibly inducing new methods of isolation or separating the different members of this group. In order to do so he attempted to isolate as many as possible of the various members of milk, feces, urine, etc.

In isolating these organisms and carrying them through the different media, there seemed to be several things brought out which seem well worth reporting at this time.

TECHNIQUE.

Preparations of Material.—The basis of all materials was the standard meat extract bouillon in which during the early part of the work Leibig's meat extract was used. Later, owing to the unusual conditions prevailing, a comparative work was undertaken with Armour's meat extract and after the results were compared, the results being identical, the latter extract of meat was used as it was more easily obtained. All other chemicals were Merck's or Schuchardt's.

For the sugar and other fermentative media, sugar free broth was used to which was added the special substance to be fermented in proportion of one per cent and later in one-fourth per cent. The indol reactions were made from four-day cultures in Dunham's pepton media, made from Witte's pepton, which pepton was also used in all the other work. The Vokes-Proskaur method was used in meat-extract-free dextrose-pepton solution in the usual and ordinary way. The test for indol was made according to the Ehrlich method.

The materials from which cultures were made were milk, urine, feces and foods sent to the laboratory in suspected ptomaine poisoning cases. For this particular work the cultures used were made from 34 samples of certified milk, 11 samples of Pasteurized whole milk, 82 samples of whole milk, non-Pasteurized, 73 samples of non-Pasteurized skimmed milk, and 10 samples

*An unfortunate error in the filing of the manuscripts in the JOURNAL office has caused this regrettable delay in the publication of this valuable article.—EDITOR.

of Pasteurized skimmed milk. The milks were plated on plain agar in different dilutions, and one cubic centimeter of milk was inoculated into lactose and dextrose bouillon. The plates were counted and the reaction read in forty-eight hours and sub-cultures were made from deep lenticular or characteristic surface colonies into bouillon. If there had been fermentation in the lactose or dextrose bouillon, or both, sub-plates were made from these media, from which bouillon cultures were made after forty-eight hours. From the plate bouillon cultures or from the lactose-plate-bouillon cultures or from the dextrose-plate-bouillon, culture inoculations were made into lactose or dextrose bouillon. In forty-eight hours these reactions were read. If fermentation had taken place in lactose or dextrose bouillon in any of the tubes, cultures were then made in salicin, mannite, dulcite, adonit, glycerin, inulin, corn starch, potato starch, sacchrose, levulose, raffinos, rhamnos, maltos, galactos, mannos, arabinos, and xylose, all of these being in sugar free broth bouillon, one-fourth of one per cent. Stab cultures were also made in agar and in gelatine, slant cultures were made on agar, and cultures were made in pepton solution and in plain bouillon. These cultures were incubated for twenty-four hours and then left at room temperature for three more days after which the results were tabulated; they were then put aside and checked at the end of not less than thirty days, when comparative differences, if any, were noticed.

It is not the purpose of the author to go into an exhaustive survey of literature in this, the preliminary report, suffice to say that the classification of the organisms as found in this work based upon the article by Bergey and Deehan,* which depends upon as conclusive and final classification, presence or absence of fermentation, saccharose, dulcite, adonit and inulin, with presence or absence of liquefaction in gelatin, presence or absence of a positive Vokes-Proskaur reaction and the presence or absence of the indol reactions.

There have been previously reported organisms corresponding to 3, 4, 6 and 8. In the work of the author organisms corresponding to 2, 4, 6, 8, 10 and 12 have been found.

Organisms which were found according to the author corresponding to No. 4, when grown in other media not mentioned in this table are found to show the following difference: One organism is positive for salicin and the other negative for salicin, showing that these organisms are different according to finer analysis.

There have been previously reported organisms 18, 19, 20, 22, 26, 28 and 31. In the work of the author the organisms corresponding to 20 were found once, 28 was found once, and 30 was found three times.

On finer analysis organisms corresponding to No. 30 found by the author show that one organism ferments salicin but does not ferment glycerin, rhamnos or raffinos. A second does not ferment salicin nor raffinos, but ferments glycerin and rhamnos, while a third does not fer-

*Journal of Medical Research, 1908, XIV, p. 175.

GROUP I.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of Gas	H/CO_2	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
1						60	3/2							1
2											+			
3						45	3/1			+		1		3
4	Bacillus grunthal					50	2/1			+	+	3		1
5									+					
6						50	1/2		+		+	5		
7									+	+				
8						50	2/3		+	+	+	5		
9								+						
10								+			+			
11								+		+				
12								+		+	+			
13								+	+					
14								+	+		+			
15								+	+	+				
16								+	+	+	+			

GROUP II.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
17		+												
18		+				30	2/1				+	2		
19	Bacterium coscorobae	+				30	2/1			+				
20		+				40	3/1			+	+	1		
21		+							+					
22		+				60	2/1		+		+	2		
23		+							+	+				
24		+							+	+	+			
25		+						+						
26		+				20	3/1	+			+	1		
27		+						+		+				
28	Bacillus vulgaris	+				20	2/1	+		+	+			
29		+						+	+					
30	Bacillus cloacae	+				75	1/1	+	+		+		8	2
31		+						+	+	+				
32		+						+	+	+	+			

ment salicin nor glycerin but does ferment rhamnos and raffinos, showing that there is a distinct difference between the three organisms of this group which according to the Bergey method were the same.

The organisms previously reported corresponding to 34, 35, 36, 38 and 44. In the work of the author organisms corresponding to 34 were found once, 36 seven times, 38 once, 42 twice, 44 five times, 46 once and 48 once.

GROUP III.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2	Gelatin.	V/P	Indol.	Motility.	Milk.	Sewage.	MacConkey.
33			+											
34	Bacillus enteritidis		+			50	2/1				+			1
35			+			30	3/1			+		1		5
36	Bacillus coli verus		+			25	2/1			+	+		4	2
37			+						+					
38			+			35	2/1		+		+	2		
39			+						+	+				
40			+						+	+	+			
41			+					+						
42			+					+			+			
43			+					+		+				
44			+			25	3/1	+		+	+			3
45			+					+	+					
46			+					+	+		+			
47			+					+	+	+				
48			+					+	+	+	+			

While apparently there were seven organisms corresponding to No. 36 of Bergey and Deehan, on further analysis one organism does not ferment salicin and raffinos but does ferment potato starch and rhamnos. One organism does not ferment salicin nor potato starch but does ferment rhamnos and raffinos. One organism ferments salicin and rhamnos but does not ferment potato starch or raffinos. One organism ferments salicin but does not ferment rhamnos or raffinos. (These organisms not inoculated in potato starch.) One organism does not ferment salicin but potato starch, rhamnos, and raffinos. Two organisms were not inoculated in potato starch but one ferments salicin and the other does not. Both ferment rhamnos but not raffinos. This shows seven possible different organisms instead of the original one. According to the Bergey and Deehan classification two organisms corresponding to No. 42 were found but one of them fermented salicin and the other did not ferment salicin so these organisms evidently were not identical.

There were five organisms which correspond to No. 44. Of these, two ferment salicin and rhamnos but did not ferment raffinos. Two fermented rhamnos and raffinos but did not ferment salicin and one fermented all three, proving the difference in identities.

The organisms previously reported corresponding to 50, 51, 52. In the work of the author organisms corresponding to 58 were found once, and 60 were found twice, both of which organisms are evidently identical because of their similar supplementary fermentative reactions.

The organisms previously reported correspond to No. 78. In the work of the author organisms corresponding to 74 and 76 were found once.

The organisms previously reported

GROUP IV.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V./P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
49	....	....	....	+	....	20	....	....	....	....	....	....	....	....
50	Bacillus icteroides	....	....	+	....	30	3/1	....	....	....	+	1	....	....
51	Bacterium acidi lactici	....	....	+	....	40	2/1	....	....	+	....	1	5	1
52	....	....	....	+	....	....	3/1	....	....	+	+	....	....	1
53	....	....	....	+	....	....	....	....	+	....	....	....	....	....
54	....	....	....	+	....	....	....	•	+	....	+	....	....	....
55	....	....	....	+	....	....	....	....	+	+	....	....	....	....
56	....	....	....	+	....	....	....	....	+	+	+	....	....	....
57	....	....	....	+	....	....	....	+	..	....	....	....	....	....
58	....	....	....	+	....	....	....	+	....	....	+	....	....	....
59	....	....	....	+	....	....	....	+	....	+	....	....	....	....
60	....	....	....	+	....	....	....	+	....	+	+	....	....	....
61	....	....	....	+	....	....	....	+	+	....	....	....	....	....
62	....	....	....	+	....	....	....	+	+	....	+	....	....	....
63	....	....	....	+	....	....	....	+	+	+	....	....	....	....
64	....	....	....	+	....	....	....	+	+	+	+	....	....	....

correspond to 83, 84, 86 and 88. In the work of the author organisms corresponding to 82 were found eight times, 84 five times, 86 five times, 90 six times, 92 eight times, 94 nine times and 96 seven times.

According to the Bergey and Deehan classification there were eight corresponding to No. 82. Of these, two did not ferment salicin but did ferment glycerin, rhamnos and raffinos. One did not ferment salicin nor gly-

GROUP V.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin	Per cent. of Gas	H/CO_2	Gelatin.	V./P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
65	....	....	....	....	+	....	....	....	....	....	+	....	....	....
66	....	....	....	....	+	....	....	....	....	+	....	....	....	....
67	....	....	....	....	+	....	....	....	....	+	+	....	....	....
68	....	....	....	....	+	....	....	....	+	....	....	....	....	....
69	....	....	....	....	+	....	....	....	+	....	+	....	....	....
70	....	....	....	....	+	....	....	....	+	+	....	....	....	....
71	....	....	....	....	+	....	....	....	+	+	+	....	....	....
72	....	....	....	....	+	....	....	+	....	....	....	....	....	....
73	....	....	....	....	+	....	....	+	....	....	+	....	....	....
74	....	....	....	....	+	....	....	+	....	+	....	....	....	....
75	....	....	....	....	+	....	....	+	....	+	+	....	....	....
76	....	....	....	....	+	....	....	+	+	....	....	....	....	....
77	....	....	....	....	+	....	....	+	+	....	+	....	....	1
78	Bacillus levans	....	....	....	+	69	1/2	+	+	+	....	....	....	....
79	....	....	....	....	+	....	....	+	+	+	+	....	....	....
80	....	....	....	....	+	....	....	+	+	+	+	....	....	....

cerin but did ferment rhamnos and raffinos. Two fermented salicin, glycerin, rhamnos and raffinos. Two others fermented salicin, glycerin, rhamnos, but not raffinos. One other did not ferment salicin nor raffinos but did ferment glycerin and rhamnos showing that there were at least five distinct organisms according to the finer classification.

According to the original classification there are five corresponding to No. 84. Of these one ferments salicin, rhamnos and raffinos but did not ferment glycerin. One ferments salicin and glycerin but does not ferment raffinos. Three ferment all four showing that there were three different organisms according to their own individual fermentations.

According to the original classification five correspond to No. 86. Of these one ferments salicin and raffinos but does not ferment glycerin nor rhamnos. Two others ferment salicin, rhamnos, and raffinos but did not ferment glycerin, and two fermented all four, consequently there must have been three different organisms which could be separated from each other.

According to the original classification there were six corresponding to No. 90. Of these three did not ferment salicin but did ferment glycerin, rhamnos and raffinos. One did not ferment salicin nor glycerin but did ferment rhamnos and raffinos. Two others fermented salicin, glycerin, rhamnos and raffinos. Two others fermented salicin, glycerin, rhamnos, but did not ferment raffinos.

According to the classification of Bergey and Deehan, eight organisms correspond to No. 92. Of these two fermented salicin, glycerin, rhamnos, but did not ferment raffinos. Three fermented salicin, rhamnos and raffinos but did not ferment glycerin. One fermented salicin, glycerin and

GROUP VI.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
81	....	+	+	....	....	....	....	....	....	....	....	....	....	....
82	....	+	+	....	....	....	....	....	....	....	+	....	....	....
83	Bacterium Neapolitanus	+	+	....	....	30	2/1	....	....	+	....	1	....	....
84	Bacillus coli communior	+	+	....	....	30	2/1	....	....	+	+	2	8	1
85	....	+	+	....	....	....	....	....	+	....	....	....	....	....
86	....	+	+	....	....	45	1/2	....	+	....	+	1	....	....
87	....	+	+	....	....	....	....	....	+	+	....	....	....	....
88	....	+	+	....	....	50	2/3	....	+	+	+	1	....	....
89	....	+	+	....	....	....	....	+	....	....	....	....	....	....
90	....	+	+	....	....	....	....	+	....	....	+	....	....	....
91	....	+	+	....	....	....	....	+	....	+	....	....	....	....
92	....	+	+	....	....	....	....	+	....	+	+	....	....	....
93	....	+	+	....	....	....	....	+	+	....	....	....	....	....
94	....	+	+	....	....	....	....	+	+	....	+	....	....	....
95	....	+	+	....	....	....	....	+	+	+	....	....	....	....
96	....	+	+	....	....	....	....	+	+	+	+	....	....	....

raffinos but did not ferment rhamnos. One fermented glycerin, rhamnos, raffinos, but did not ferment salicin and one fermented all four showing that there were at least five different organisms on finer analysis.

According to the above classification of Bergey and Deehan, nine organisms were found corresponding to No. 94. Of these, one ferments salicin, glycerin, rhamnos. One ferments salicin, rhamnos, raffinos, but does not ferment glycerin. One ferments salicin and rhamnos but not glycerin and raffinos and three ferments salicin, glycerin, raffinos and rhamnos. Two did not ferment salicin but fermented glycerin, rhamnos and raffinos. One did not ferment salicin nor rhamnos but fermented glycerin and raffinos, thus showing that instead of one organism there were really seven different organisms corresponding to this number.

Of the seven organisms corresponding to No. 96, one ferments salicin, glycerin and raffinos, but did not ferment rhamnos. One ferments salicin, rhamnos and raffinos but did not ferment glycerin. Five ferment salicin, glycerin, rhamnos and raffinos, thus showing that there were three distinct organisms corresponding to No. 96 of the original classification.

The organisms previously reported corresponding to 97, 99, 101 and 103. In the work of the author 110 was found once.

The organisms previously reported correspond to 116. In the work of the author 124 was found once.

The organisms previously reported correspond to No. 132. In the work of the author No. 132 was found three times, 136 was found once, 140 was found three times, 142 was found once, 144 was found three times.

According to the original classification three organisms corresponding to No. 132 were found. Of these, one ferments salicin, glycerin, but did not

GROUP VII.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2	Gelatin.	V/P	Indol.	Motility.	Milk.	Sewage.	MacConkey.
97	....	+	....	+	....	50	2/1	....	....	....	....	....	....	2
98	....	+	....	+	....	....	....	....	....	....	+	....	....	....
99	....	+	....	+	....	30	3/1	....	....	+	....	4	....	....
100	....	+	....	+	....	....	....	....	....	+	+	....	....	....
101	....	+	....	+	....	90	2/3	....	+	....	....	....	....	1
102	....	+	....	+	....	....	....	....	+	....	+	....	....	....
103	Bacterium aerogenes	+	....	+	....	50	2/1	....	+	+	....	3	6	....
104	....	+	....	+	....	....	....	....	+	+	+	....	....	....
105	....	+	....	+	....	....	....	+	....	....	....	....	....	....
106	....	+	....	+	....	....	....	+	....	....	+	....	....	....
107	....	+	....	+	....	....	....	+	....	+	....	....	....	....
108	....	+	....	+	....	....	....	+	....	+	+	....	....	....
109	....	+	....	+	....	....	....	+	+	....	....	....	....	....
110	....	+	....	+	....	....	....	+	+	....	+	....	....	....
111	....	+	....	+	....	....	....	+	+	+	....	....	....	....
112	....	+	....	+	....	....	....	+	+	+	+	....	....	....

GROUP VIII.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
113		+			+									
114		+			+						+			
115		+			+					+				
116		+			+	30	4/1			+	+	1		
117		+			+				+					
118		+			+				+		+			
119		+			+				+	+				
120		+			+				+	+	+			
121		+			+			+						
122		+			+			+			+			
123		+			+			+		+				
124		+			+			+		+	+			
125		+			+			+	+					
126		+			+			+	+		+			
127		+			+			+	+	+				
128		+			+			+	+	+	+			

GROUP IX.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of Gas	H/CO_2	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
129			+	+										
130			+	+							+			
131			+	+						+				
132			+	+		23	2/1			+	+		1	
133			+	+					+					
134			+	+					+		+			
135			+	+					+	+				
136			+	+					+	+	+			
137			+	+				+						
138			+	+				+			+			
139			+	+				+		+				
140			+	+				+		+	+			
141			+	+				+	+					
142			+	+				+	+		+			
143			+	+				+	+	+				
144			+	+				+	+	+	+			

ferment rhamnos nor raffinos and two did not ferment salicin but did ferment glycerin, raffinos and rhamnos showing that there were at least two distinct organisms corresponding to No. 132.

According to the original classification three corresponding to No. 140 were found. Of these, two did not ferment salicin but did ferment glycerin, rhamnos and raffinos and one fermented salicin and rhamnos but did not fer-

ment glycerin and raffinos, showing that there were at least two distinct organisms.

According to the original classification three corresponding to No. 144 were found, all of which fermented salicin, glycerin, rhamnos and raffinos, showing them to be identical.

No organisms of Group X were found by the author.

No organisms of Group XI were found by the author.

GROUP X.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
145	....	....	+	....	+	....	....	....	....	....	....	....	....	....
146	....	....	+	....	+	....	....	....	....	....	+	....	....	....
147	....	....	+	....	+	....	....	....	....	+	....	....	....	....
148	....	....	+	....	+	....	....	....	....	+	+	....	....	....
149	....	....	+	....	+	....	....	....	+	....	....	....	....	....
150	....	....	+	....	+	....	....	....	+	....	+	....	....	....
151	....	....	+	....	+	....	....	....	+	+	....	....	....	....
152	....	....	+	....	+	....	....	....	+	+	+	....	....	....
153	....	....	+	....	+	....	....	+	....	....	....	....	....	....
154	....	....	+	....	+	....	....	+	....	....	+	....	....	....
155	....	....	+	....	+	....	....	+	....	+	....	....	....	....
156	....	....	+	....	+	....	....	+	....	+	+	....	....	....
157	....	....	+	....	+	....	....	+	+	....	....	....	....	....
158	....	....	+	....	+	....	....	+	+	....	+	....	....	....
159	....	....	+	....	+	....	....	+	+	+	....	....	....	....
160	....	....	+	....	+	....	....	+	+	+	+	....	....	....

GROUP XI.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2	Gelatin.	V/P	Indol.	Motility.	Milk.	Sewage.	MacConkey.
161	....	....	....	+	+	....	....	....	....	....	....	....	....	....
162	....	....	....	+	+	....	....	....	....	....	+	....	....	....
163	....	....	....	+	+	....	....	....	....	+	....	....	....	....
164	....	....	....	+	+	....	....	....	....	+	+	....	....	....
165	....	....	....	+	+	....	....	....	+	....	....	....	....	....
166	....	....	....	+	+	....	....	....	+	....	+	....	....	....
167	....	....	....	+	+	....	....	....	+	+	....	....	....	....
168	....	....	....	+	+	....	....	....	+	+	+	....	....	....
169	....	....	....	+	+	....	....	+	....	....	....	....	....	....
170	....	....	....	+	+	....	....	+	....	....	+	....	....	....
171	....	....	....	+	+	....	....	+	....	+	....	....	....	....
172	....	....	....	+	+	....	....	+	....	+	+	....	....	....
173	....	....	....	+	+	....	....	+	+	....	....	....	....	....
174	....	....	....	+	+	....	....	+	+	....	+	....	....	....
175	....	....	....	+	+	....	....	+	+	+	....	....	....	....
176	....	....	....	+	+	....	....	+	+	+	+	....	....	....

GROUP XII.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
177	....	+	+	+	....	80	1/2	....	....	....	....	2	....	....
178	....	+	+	+	....	....	....	....	....	....	+	....	....	....
179	Bacterium pneumonicum	+	+	+	....	30	3/1	....	....	+	....	....	....	....
180	....	+	+	+	....	40	3/1	....	....	+	+	....	....	1
181	....	+	+	+	....	75	3/2	....	+	....	....	....	....	1
182	....	+	+	+	....	....	....	....	+	....	+	....	....	....
183	....	+	+	+	....	20	1/2	....	+	+	....	1	....	....
184	....	+	+	+	....	....	....	....	+	+	+	....	....	....
185	....	+	+	+	....	....	....	+	....	....	....	....	....	....
186	....	+	+	+	....	....	....	+	....	....	+	....	....	....
187	....	+	+	+	....	....	....	+	....	+	....	....	....	....
188	....	+	+	+	....	....	....	+	....	+	+	....	....	....
189	....	+	+	+	....	....	....	+	+	....	....	....	....	....
190	....	+	+	+	....	....	....	+	+	....	+	....	....	....
191	....	+	+	+	....	....	....	+	+	+	....	....	....	....
192	....	+	+	+	....	....	....	+	+	+	+	....	....	....

The organisms previously reported correspond to 177, 179, 180, 181 and 183. In the work of the author No. 180 was found nine times, 182 was found six times, 184 was found six times, 186 was found seven times, 188 was found nine times, 190 was found three times, 192 was found fourteen times.

According to the original classification nine organisms corresponding to No. 180 were found. Of these, one ferments salicin, glycerin and raffinos but did not ferment rhamnos. Two did not ferment salicin but fermented glycerin, rhamnos and raffinos. Six fermented salicin, glycerin, rhamnos and raffinos showing that there were at least three distinct organisms corresponding to No. 180.

Of the six organisms found corresponding to No. 182 of the original classification, one ferments salicin, glycerin and raffinos but does not ferment rhamnos and five ferment salicin, glycerin, rhamnos and raffinos, showing that there are at least two different organisms which might be classified as No. 182 of the Bergey and Deehan class.

Of the six found corresponding to No. 184 of the original classification, one does not ferment salicin but does ferment glycerin, rhamnos, raffinos and levulose (potato starch not used). One ferments salicin, glycerin, rhamnos, raffinos, potato starch, but does not ferment levulose. One ferments salicin, glycerin, rhamnos, raffinos and levulose but does not ferment potato starch and three ferment salicin, glycerin, rhamnos, raffinos, levulose (potato starch not used), showing that there are at least three different organisms which are classified by Bergey and Deehan as No. 184.

Of the seven which correspond to No. 186 of the original classification,

one ferments salicin, rhamnos, raffinos, but does not ferment glycerin (corn starch and potato starch not used). One ferments salicin, glycerin, rhamnos but does not ferment raffinos, corn starch nor potato starch. One ferments salicin, glycerin, rhamnos and raffinos and potato starch (corn starch not used). One ferments salicin, glycerin, raffinos and rhamnos but does not ferment corn starch nor potato starch. Two ferment salicin, glycerin, rhamnos and raffinos and corn starch but do not ferment potato starch and one ferments salicin, glycerin, rhamnos and raffinos, corn starch and potato starch, showing that there were at least five and possibly six different organisms corresponding to the original No. 186.

Of the nine which correspond to the original No. 188, one ferments salicin, glycerin, rhamnos and raffinos (potato starch and corn starch not used). One ferments salicin, glycerin, rhamnos, raffinos, corn starch, but does not ferment potato starch and two ferment salicin, glycerin, rhamnos and raffinos but does not ferment corn starch nor potato starch. One does not ferment salicin, but ferments glycerin, rhamnos and raffinos (potato starch and corn starch not used). Four do not ferment salicin nor potato starch nor corn starch but do ferment glycerin, raffinos and rhamnos, showing that there were at least three and possibly five different organisms corresponding to the original No. 188.

Of the three organisms corresponding to No. 190, one ferments salicin, glycerin, rhamnos, raffinos and potato starch but does not ferment corn starch. One ferments salicin, glycerin, raffinos and potato starch but does not ferment rhamnos nor corn starch and one ferments glycerin, rhamnos and raffinos but does not ferment salicin nor potato starch nor corn starch, showing that there were three distinct organisms corresponding to the original No. 190.

Of the fourteen organisms corresponding to No. 192 of the original classification, seven ferment salicin, glycerin, raffinos, rhamnos, but do not ferment corn starch nor potato starch. One ferments salicin, glycerin, rhamnos, raffinos and corn starch (potato starch not used). One ferments salicin, glycerin, rhamnos and raffinos and potato starch but does not ferment corn starch. Three do not ferment salicin nor corn starch but did ferment glycerin, rhamnos, raffinos and potato starch. One does not ferment salicin, corn starch nor potato starch but does ferment glycerin, rhamnos and raffinos and one ferments salicin, glycerin, rhamnos, raffinos, corn starch and potato starch showing that there were at least six distinct organisms corresponding to the original No. 192.

The organisms previously reported correspond to 197 and 198. In the work of the author No. 194 was found twice, 196 was found once, 200 was found twice, 202 was found twice, 204 was found six times, 206 was found once, 208 was found three times.

Of the two organisms which correspond to the original No. 194, both are apparently the same organism.

Of the two organisms corresponding to No. 200 of the original classification

GROUP XIII.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of Gas	H/CO_2	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
193	....	+	+	....	+	....	....	....	....	....	....	....	....	....
194	....	+	+	....	+	....	....	....	....	....	+	....	....	....
195	....	+	+	....	+	....	....	....	....	+	....	....	....	....
196	....	+	+	....	+	....	....	....	....	+	+	....	....	....
197	....	+	+	....	+	50	1/1	....	+	....	....	....	1	....
198	....	+	+	....	+	50	2/1	....	+	....	+	1	....	....
199	....	+	+	....	+	....	....	....	+	+	....	....	....	....
200	....	+	+	....	+	....	....	....	+	+	+	....	....	....
201	....	+	+	....	+	....	....	+	....	....	....	....	....	....
202	....	+	+	....	+	....	....	+	....	....	+	....	....	....
203	....	+	+	....	+	....	....	+	....	+	....	....	....	....
204	....	+	+	....	+	....	....	+	....	+	+	....	....	....
205	....	+	+	....	+	....	....	+	+	....	....	....	....	....
206	....	+	+	....	+	....	....	+	+	..	+	....	....	....
207	....	+	+	....	+	....	....	+	+	+	....	....	....	....
208	....	+	+	....	+	....	....	+	+	+	+	....	....	....

one ferments salicin, glycerin, rhamnos and raffinos and the other does not ferment salicin and ferments glycerin, rhamnos and raffinos, showing that these are two distinct organisms. Of the two organisms which correspond to the original No. 202, one ferments salicin, glycerin, rhamnos, and corn starch but does not ferment raffinos nor potato starch. The other ferments salicin, glycerin, rhamnos, raffinos, but does not ferment corn starch (potato starch not used), showing that there are two distinct organisms corresponding to this original.

Of the five organisms corresponding to the original No. 204, one ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch nor potato starch. One does not ferment salicin nor raffinos, nor corn starch nor potato starch but does ferment glycerin and rhamnos. Two do not ferment salicin nor corn starch nor potato starch but do ferment glycerin, rhamnos and raffinos and one ferments salicin, glycerin, rhamnos and raffinos and both corn starch and potato starch, showing that at least the original No. 204 comprises at least four distinct organisms.

Of the two cultures which correspond to the original No. 208, both ferment salicin, glycerin, rhamnos and raffinos, but one ferments dextrose and the other does not ferment dextrose showing the distinct difference.

The organisms previously reported correspond to 211, 213, 215. In the work of the author organisms corresponding to No. 224 were found once.

No organisms of this group were found by the author.

The organisms previously reported correspond to 245, 247, and 248. In the work of the author organisms corresponding to No. 242 were found once, 244 five times, 246 three times, 248 five times, 250 three times, 252 five

GROUP XIV.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
209	....	+	....	+	+	....	....	....	....	....	....	....	....	....
210	....	+	....	+	+	....	....	....	....	....	+	....	....	....
211	....	+	....	+	+	75	2/1	....	....	+	....	2	....	....
212	....	+	....	+	+	....	....	....	....	+	+	....	....	....
213	....	+	....	+	+	30	2/1	....	+	....	....	1	....	1
214	....	+	....	+	+	....	....	....	+	....	+	....	....	....
215	....	+	....	+	+	....	1/1	....	+	+	....	2	....	1
216	....	+	....	+	+	....	....	....	+	+	+	....	....	....
217	....	+	....	+	+	....	....	+	....	....	....	....	....	....
218	....	+	....	+	+	....	....	+	....	....	+	....	....	....
219	....	+	....	+	+	....	....	+	....	+	....	....	....	....
220	....	+	....	+	+	....	....	+	....	+	+	....	....	....
221	....	+	....	+	+	....	....	+	+	....	....	....	....	....
222	....	+	....	+	+	....	....	+	+	....	+	....	....	....
223	....	+	....	+	+	....	....	+	+	+	....	....	....	....
224	....	+	....	+	+	....	....	+	+	+	+	....	....	....

GROUP XV.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2	Gelatin.	V/P	Indol.	Motility.	Milk.	Sewage.	MacConkey.
225	....	....	+	+	+	....	....	....	....	....	....	....	....	....
226	....	....	+	+	+	....	....	....	....	....	+	....	....	....
227	....	....	+	+	+	....	....	....	....	+	....	....	....	....
228	....	....	+	+	+	....	....	....	....	+	+	....	....	....
229	....	....	+	+	+	....	....	....	+	....	....	....	....	....
230	....	....	+	+	+	....	....	....	+	....	+	....	....	....
231	....	....	+	+	+	....	....	....	+	+	....	....	....	....
232	....	....	+	+	+	....	....	....	+	+	+	....	....	....
233	....	....	+	+	+	....	....	+	....	....	....	....	....	....
234	....	....	+	+	+	....	....	+	....	....	+	....	....	....
235	....	....	+	+	+	....	....	+	....	....	....	....	....	....
236	....	....	+	+	+	....	....	+	....	+	+	....	....	....
237	....	....	+	+	+	....	....	+	+	....	....	....	....	....
238	....	....	+	+	+	....	....	+	+	....	+	....	....	....
239	....	....	+	+	+	....	....	+	+	+	....	....	....	....
240	....	....	+	+	+	....	....	+	+	+	+	....	....	....

times, 254 eight times, 256 eighteen times.

Of the five organisms corresponding to the original No. 244, one ferments salicin, glycerin, rhamnos, raffinos and potato starch but does not ferment corn starch. Three ferment salicin, glycerin, rhamnos, raffinos, but do not ferment corn starch and potato starch. One does not ferment salicin, nor corn starch but ferments glycerin, rhamnos, raffinos and potato

GROUP XVI.

Name	Dextrin	Saccharose	Lactose	Maltose	Glucose	Levulose	Inulin	Mannite	Glycerin	Salicin	Rhamnose	Raffinose	Starch	Inosite	Acids	Alkali	Gelatin	Litmus	Indol	Nitrites	Bacteria extracted
244																					
245																					
246																					
247																					
248																					
249																					
250																					
251																					
252																					
253																					
254																					
255																					

starch, showing that there are at least three distinct organisms under the original No. 244.

Of the three organisms which are classified as the original No. 246, two ferment salicin, glycerin, rhamnos and raffinos but do not ferment corn starch. One ferments all of these substances, showing that there are at least two distinct organisms under the original No. 246.

Of the five organisms of the original No. 248, one ferments salicin, glycerin, rhamnos, raffinos (corn starch not used). One ferments salicin, glycerin, raffinos, but does not ferment rhamnos nor corn starch. Two ferment salicin, glycerin, rhamnos, raffinos, but do not ferment corn starch nor potato starch. One ferments glycerin, rhamnos, and raffinos but does not ferment salicin nor corn starch nor potato starch, showing that there are at least four distinct organisms corresponding to the original No. 248.

Of the three organisms corresponding to No. 250 one ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch nor potato starch. One ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch (potato starch not used). One ferments all of these substances, showing that there are at least two and possibly three distinct organisms under the original No. 250.

Of the five corresponding to the original No. 252, one ferments salicin, glycerin and raffinos but does not ferment rhamnos nor corn starch (potato starch not used). One ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch nor potato starch. One ferments glycerin and raffinos but does not ferment salicin, rhamnos nor corn starch nor potato starch. Two ferment glycerin, rhamnos, raffinos and potato starch but does not ferment

salicin, but does not ferment phenylin, that there are at least two distinct organisms which might be classified in the original No. 93.

(3) The eighth organism of the original classification, No. 93, ferments salicin, glycerin, rhamnose and raffinose (not starch and potato starch not used). Does ferment salicin, glycerin, rhamnose, raffinose and potato starch, but does not ferment starch nor phenylin. Does ferment glycerin, rhamnose, raffinose and potato starch, but does not ferment salicin nor starch. Does ferment rhamnose and raffinose, but does not ferment salicin, glycerin, nor starch nor potato starch. Shows, therefore, at least four distinct organisms which might be classified in No. 93.

(4) The eighth organism of the original classification No. 93, fermented salicin, glycerin, rhamnose and raffinose (corn starch not used). Does ferment salicin, glycerin, raffinose and potato starch, but does not ferment rhamnose nor corn starch. Does ferment salicin, glycerin, rhamnose and raffinose but does not ferment potato starch. Does ferment salicin, glycerin, rhamnose, raffinose but does not ferment corn starch (potato starch not used). Does ferment salicin, glycerin, rhamnose, and raffinose but does not ferment corn starch nor potato starch. Does ferment salicin, glycerin, rhamnose, raffinose and potato starch but does not ferment corn starch. Two ferment all of these substances. Does not ferment salicin but ferments glycerin, rhamnose, raffinose, corn starch and potato starch. Does not ferment salicin, rhamnose nor corn starch, but ferments glycerin, raffinose and potato starch. Does not ferment salicin, corn starch nor potato starch, but ferments glycerin, rhamnose and raffinose. Shows, therefore, at least one, two, three, four, five, six, seven, eight and possibly nine or more distinct variations which might be classified under the original No. 93.

Summary.

From the above it stands out very distinctly that in the use of rhamnose and raffinose, salicin and glycerin con starch and potato starch many organisms may be separated which according to the Rogers and Davies classification might be identical. For instance all those organisms which fall in Group V, Group VII, Group X, Group XI, Group XIII, Group XIV, Group XV, ferment inulin as when the above organisms are examined there are many instances found where the fermentation is not shown in potato starch or both may differ from those of inulin. The cases appear in two, namely, that in those groups where inulin is not fermented some of the organisms ferment either corn starch or potato starch (both). Other authors have used salicin, glycerin, rhamnose, raffinose but the author wants to take the occasion to emphasize that neutrinose is the most efficient individual organism.

Right in its use (*Journal of Infectious Diseases*, July, 1911) now salicin and glycerin as the best isolation and sub-division, notwithstanding the disadvantage, and the author want to take the occasion to

GROUP XVI.

No.	Name.	Saccharose.	Dulcit.	Adonit.	Inulin.	Per cent. of gas.	H/CO_2.	Gelatin.	V/P.	Indol.	Motility.	Milk.	Sewage.	MacConkey.
241	....	+	+	+	+	....	....	....	....	....	....	....	....	....
242	....	+	+	+	+	....	....	....	....	....	+	....	....	....
243	....	+	+	+	+	....	....	....	....	+	....	....	....	....
244	....	+	+	+	+	....	....	....	....	+	+	....	....	....
245	Bacterium oxytocum	+	+	+	+	60	1/1	....	+	....	....	....	8	1
246	....	+	+	+	+	....	....	....	+	....	+	....	....	....
247	....	+	+	+	+	90	1/1	....	+	+	....	1	....	4
248	....	+	+	+	+	50	3/2	....	+	+	+	1	....	....
249	....	+	+	+	+	....	....	+	....	....	....	....	....	....
250	....	+	+	+	+	....	....	+	....	....	+	....	....	....
251	....	+	+	+	+	....	....	+	....	+	....	....	....	....
252	....	+	+	+	+	....	....	+	....	+	+	....	....	....
253	....	+	+	+	+	....	....	+	+	....	....	....	....	....
254	....	+	+	+	+	....	....	+	+	....	+	....	....	....
255	....	+	+	+	+	....	....	+	+	+	....	....	....	....
256	....	+	+	+	+	....	....	+	+	+	+	....	....	....

starch, showing that there are at least three distinct organisms under the No. 244.

Of the three organisms which are classified as the original No. 246, two ferment salicin, glycerin, rhamnos and raffinos but do not ferment corn starch. One ferments all of these substances, showing that there are at least two distinct organisms under the original No. 246.

Of the five organisms of the original No. 248, one ferments salicin, glycerin, rhamnos, raffinos (corn starch not used). One ferments salicin, glycerin, raffinos, but does not ferment rhamnos nor corn starch. Two ferment salicin, glycerin, rhamnos, raffinos, but do not ferment corn starch nor potato starch. One ferments glycerin, rhamnos, and raffinos but does not ferment salicin nor corn starch nor potato starch, showing that there are at least four distinct organisms corresponding to the original No. 248.

Of the three organisms corresponding to No. 250, one ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch nor potato starch. One ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch (potato starch not used). One ferments all of these substances, showing that there are at least two and possibly three distinct organisms under the original No. 250.

Of the five corresponding to the original No. 252, one ferments salicin, glycerin and raffinos but does not ferment rhamnos nor corn starch (potato starch not used). One ferments salicin, glycerin, rhamnos and raffinos but does not ferment corn starch nor potato starch. One ferments glycerin and raffinos but does not ferment salicin, rhamnos nor corn starch nor potato starch. Two ferment glycerin, rhamnos, raffinos and potato starch but does not ferment

salicin nor corn starch, showing that there are at least four distinct organisms which might be classified in the original No. 252.

Of the eight organisms of the original classification No. 254, two ferments salicin, glycerin, rhamnos and raffinos (corn starch and potato starch not used). Four ferment salicin, glycerin, rhamnos, raffinos and potato starch but do not ferment corn starch. One ferments glycerin, rhamnos, raffinos and potato starch but does not ferment salicin and corn starch. One ferments rhamnos and raffinos but does not ferment salicin, glycerin, corn starch and potato starch, showing that there are at least four distinct organisms which might be classified in No. 254.

Of the eighteen organisms of the original classification No. 256, five ferment salicin, glycerin, rhamnos and raffinos (corn starch and potato starch not used). One ferments salicin, glycerin, raffinos and potato starch but does not ferment rhamnos nor corn starch. One ferments salicin, glycerin, rhamnos and raffinos and corn starch but does not ferment potato starch. One ferments salicin, glycerin, rhamnos, raffinos but does not ferment corn starch (potato starch not used). One ferments salicin, glycerin, rhamnos, and raffinos but does not ferment corn starch nor potato starch. One ferments salicin, glycerin, rhamnos, raffinos and potato starch but does not ferment corn starch. Two ferment all of these substances. One does not ferment salicin but ferments glycerin, rhamnos, raffinos, corn starch and potato starch. One does not ferment salicin, rhamnos nor corn starch but ferments glycerin, raffinos and potato starch. Two do not ferment salicin, corn starch nor potato starch but ferments glycerin, rhamnos and raffinos, thus showing that there are at least one, two, three, four, five, six, seven, eight and possibly nine, ten or eleven different varieties which might be classified under the original No. 256.

Summary.

From the above it stands out very distinctly that by the use of rhamnos and raffinos, salicin and glycerin, corn starch and potato starch many organisms may be separated which according to the Bergey and Deehan classification might be identical. For instance all those organisms which fall in Group V, Group VIII, Group X, Group XI, Group XIII, XIV, XV, Group XVI, ferment inulin, yet when the above organisms are examined there are many instances found where the fermentation of corn starch or potato starch or both may differ from those of inulin. The exact opposite is true, namely, that in those groups where inulin is not fermented some of the organisms ferments either corn starch or potato starch or both. Other authors have used salicin, glycerin, rhamnos, raffinos but the author wants to take this occasion to emphasize their usefulness as the means of identifying individual organisms.

Kligler in his work (*Journal of Infectious Diseases*, July, 1914) used salicin and glycerin as the basis of his isolation and sub-division, but his classification has this disadvantage and the author wants to take this occasion to

point it out, viz.: that salicin and glycerin are fermented very slowly and for quick work necessary for the isolation of at least the group or sub-group of B. coli, these substances can not be used. For instance it frequently happens that the author found salicin or glycerin would not be fermented in four days when the original checking was made but at the end of thirty days either one or the other might be fermented. It was frequently found that either glycerin or salicin under those conditions was fermented. If, on the other hand, time is not to be considered, then salicin and glycerin become quite essential in the ultimate analysis of the sub-groups of B. coli.

In Conclusion.

Members of the Colon group were found in milk taken from various sources and when the media mentioned above were used, organisms were found according to the Bergey and Deehan classification, which up to that time had not been described. The Bergey and Deehan classification is apparently a very good working basis but it must be enlarged in order to bring out organisms which have not as yet been described. Another conclusion to be brought out from this work is certain sugars, levulose, maltose, galactos, xylos, mannos and arabinos are valueless as far as differentiating the members of the sub-group; however, they are useful in showing fermentation by members of this group of organisms.

Note.—In working out the above problems it became very apparent that the ratio of hydrogen and carbon-dioxide had a definite relation of the negative or positive Vokes-Proskaur reaction. If the Vokes-Proskaur was positive the hydrogen-carbon-dioxide ratio was either one to one or the carbon dioxide was greater than that of hydrogen. If the reaction was negative the reverse was always true. Further work on this ratio is now being carried out in this laboratory.

TUBERCULOSIS DEATH-RATE DECREASES IN CALIFORNIA.

For many years California has had one of the highest, if not the very highest, tuberculosis death-rate of any state in the Union, with the possible exception of some southern states having high colored populations. Dr. W. A. Sawyer, Secretary of the California State Board of Health, says that the tremendous drop in the California death-rate for this disease during 1916, however, gives hope that California may soon loose this unenviable record. The tuberculosis death-rate in California dropped from 194.5 per hundred thousand population in 1916 to 178.5 per hundred thousand population in 1916. This means that there were 5,254 deaths in 1916, against 5,551 such deaths in 1915.

REPORT OF COMMITTEE ON SANITARY CONTROL OF WATERWAYS.

Read before the Sanitary Engineering Section of the American Public Health Association, Cincinnati, Ohio, October 26, 1916.

THE Committee on Sanitary Control of Waterways presents this report summarizing certain principles relating to the sanitary control of waterways and embodying a code of regulations for such control.

History of Committee's Work. Since the establishment of a Committee on Sanitary Control of Waterways, the committee's activities have been conducted along two lines, namely:

1. Gathering information on the subject of waterway sanitation.

2. Preparing statement of current acceptable practice in dealing with problems of waterway pollution.

During 1913 and 1914 the committee devoted its attention largely to gathering information. As a result of the committee's efforts several members of the section presented papers discussing the status of the control of waterway sanitation in various parts of the United States. Some of these papers, presented at the annual convention in 1914, appear in Vol. 4, 1914, pages 819 to 884, inclusive, of the AMERICAN JOURNAL OF PUBLIC HEALTH.

In 1913 the committee prepared a report setting forth what was then regarded as acceptable practice, and pointed out the lines along which further development and further knowledge might be expected. This report appears in Vol. 4, 1914, pages 934 to 938, of the AMERICAN JOURNAL OF PUBLIC HEALTH.

In 1915 a tentative preliminary report of the same nature was presented informally by the chairman of the committee, the report being retained, however, in the hands of the committee.

Object of Report. At the present time the committee believes that the condition of the art of sewage and industrial wastes treatment and the consensus of opinion about waterways sanitation, warrant it in again presenting a report on acceptable practice. This report, however, is not to be regarded as final, but merely as an endeavor to state principles and practice in the light of present knowledge. It is to be expected that this report will be superseded by others in the future.

This section, of course, has no governmental authority to formulate rules or standards, nor to enforce its conclusions. Nevertheless, it may deal with the question in a broad way and, recognizing certain principles and practices, adopt general regulations which may serve as a basis for similar rulings to be promulgated by official boards.

An effort has been made in formulating this report, to present fundamental considerations in a way that may be readily understood by the layman, that it may assist in crystallizing public opinion as to what is necessary or adequate for preserving the cleanliness of waterways. A discussion of technical methods and devices used by

experts, in studying the effect of polluting matter upon waterways, while of the greatest importance, may be considered more advantageously by other committees and by other sections.

Certain principles recognized as underlying the proper solution of waterway pollution problems, are first presented, following which is a code of regulations which may be said to be an expression of the present consensus of opinion.

Fundamental Principles Governing the Sanitary Control of Waterways.

1. Generally speaking, there are three distinctive, important and somewhat independent characteristics of sewage and other waste polluting matters which are primarily the cause of the objectionable condition of our streams; grosser suspended matters largely of an organic nature, which may give rise to objectionable deposits; organic matter in a finely divided or soluble state which under certain conditions may give rise to putrefactive odors; and pathogenic bacteria which may cause disease. The first two of these are closely identified with the creation of conditions which may be objectionable from an esthetic point of view, and the latter of conditions affecting health.

2. With present knowledge of the various artificial processes of sewage treatment and of water purification, it is possible theoretically, though not always practicable, by either or both of these processes to carry purification to almost any desired degree.

3. Owing to the natural supply of dissolved oxygen generally carried by surface water and its capacity to oxidize or assimilate organic matter present, and to the dispersion and dilution that generally occurs when sewage and wastes are properly discharged into running streams and other bodies of water, the discharge of sewage and wastes into such waters must be accepted as a natural and, under proper restrictions, a suitable method of disposal. Such restrictions apply to the quantity and quality of water available for dilution, the physical character of the bed and banks or shores of the body of water, the quantity and character of the polluting matter being or to be disposed of, the uses of the waterway for water supply, ice supply, recreation purposes including bathing, and food supply.

4. The method of disposal, termed "dilution," constitutes a valuable sanitary and economic resource or asset to communities and industrial establishments situated upon or along waterways adapted to this use, and each party is entitled to its proportional and justifiable share in this natural resource.

5. With the natural growth of population and industries throughout the country, it is impracticable to maintain our streams in their original state of purity, and all municipalities taking water supplies from waters flowing off from populated drainage areas must for the proper protection of public health provide themselves with water purification plants irrespective of the methods employed for sewage disposal.

6. The requirements and share of responsibilities to be met by various municipalities, corporations and persons in regard to treatment of sewage and other wastes, purification of water and the use of bodies of water, involve not only sanitary but economic and legal considerations the jurisdiction and administration of which should be left to the proper authorities.

Code of Regulations for the Sanitary Control of Waterways.

With this brief statement of certain fundamental principles which have a direct and important bearing upon this subject, the following code of regulations for the sanitary control of waterways, is presented for adoption by the section:

1. There shall be no objectionable deposits at any point in a waterway as a result of sewage or other wastes discharged therein.

Note: To prevent such deposits public authorities should recognize the efficacy of such preventive and corrective measures as the dredging and removing of the deposits before they become objectionable, the proper location of sewer outlets and the removal of solids by screening, sedimentation, chemical precipitation and like methods.

II. There shall be no local nuisance created at or in the vicinity of any sewage or industrial wastes outfall, arising from excessive turbidity or the production of odors.

Note: To prevent such conditions public authorities should recognize the efficacy of such preventive and corrective measures as the arrangement and proper protection of sewage outlets and all methods of sewage treatment in properly designed plants, including screening, sedimentation, chemical precipitation, oxidation in various types of coarse and fine-grained filters and treatment by the activated sludge process.

III. There shall be no general nuisance created in a waterway due to excessive turbidity or to odors, as a result of sewage or other wastes discharged therein.

Note: To prevent such conditions public authorities should recognize the efficacy of such methods of sewage treatment as are enumerated in Article II, but it will be necessary to carry the treatment far enough to meet the following requirements:

1. That dissolved oxygen shall be present in the waters of the waterway at all points and at all times in such quantities as to prevent the emanation of putrefactive odors.

2. That every municipality or industrial establishment discharging sewage or wastes into a waterway may have its proper share of the dissolved oxygen, subject to the aforesaid limitation of paragraph 1.

3. That the share of dissolved oxygen of a waterway, which a municipality or industrial establishment may utilize at any time, should be subject only to the aforesaid limitation (stated in paragraph 1), so long as other parties are not utilizing it nor thereby being deprived of its use.

4. That as the size and number of municipalities or industrial establishments discharging sewage or wastes into the waterway, increases, and the available share of dissolved oxygen for each decreases, treatment methods must be increased generally and correspondingly, in order that each party may continue to have the share of the available oxygen to which it is entitled.

IV. There shall be no interference with or undue burden upon mechanical operation or bacterial efficiency of water purification plants procuring their raw water from a waterway.

Note: The public authorities should recognize in this case:

1. The efficacy of re-locating water supply intakes and sewer outlets as a means of remedy.

2. The efficacy of such methods of sewage

treatment as will reduce the quantity or alter the character of either that suspended matter or that dissolved matter, or both, which may interfere directly or indirectly with the mechanical efficiency and operation of water purification plants.

3. The efficacy of such methods of treatment as will reduce the number of bacteria which may cause a bacterial burden upon water purification plants.

4. That since water or sewage purification processes can be carried to any desired limit, at least theoretically, the share of responsibility which is to be imposed upon the different sewage disposal and water purification plants, with respect to extent of purification, will obviously depend upon a number of legal and administrative considerations of an economic, engineering and public health nature which properly come within the jurisdiction of central authorities and the courts.

V. There shall be no active (potentially dangerous) bacterial contamination or gross pollution of properly located and authorized shellfish beds.

Note: Public authorities should recognize in this matter five important features:

1. The proper supervision, by competent authority, of the location of shellfish beds and drinking places, and suitable control of shellfish operation.

2. That the gross pollution of shellfish beds by deposits of suspended matter from sewage or industrial wastes can be prevented, and that bacterial contamination of the beds may be avoided, by relocation of sewer outlets.

3. That the gross pollution of shellfish beds by deposits of suspended matter from sewage or industrial wastes, can be prevented also by the installation of proper sewage treatment processes which will remove these solids to the extent necessary.

4. That where shellfish beds are so located as not to be subject to gross pollution and where bacterial protection only will be necessary, this protection can be accomplished satisfactorily by the employment of such methods of treatment as will destroy or remove the bacteria.

5. That since active bacterial contamination and gross pollution of shellfish beds can be prevented by proper location of such beds and by proper location of sewer outfalls and proper treatment of sewage and other wastes, the enforcement of the abandonment or re-location of shellfish beds or of preventive or remedial measures to protect such beds will obviously depend upon a number of legal and administrative considerations of an economic, engineering and public health nature which properly come within the jurisdiction of central authorities and the courts.

VI. There shall be no active (potentially dangerous) bacterial contamination or gross pollution of properly located and authorized bathing beaches and other bathing places.

Note: The public authorities should recognize in this matter:

1. That notwithstanding the legal rights of riparian owners, in view of our knowledge of the dangers to health arising from bathing in waters contaminated by the bathers themselves as well as from sewage and wastes discharged into them, control is needed both in the selection and authorization of bathing places and of the discharge of sewage and wastes into the waters in which bathing is authorized.

2. That the gross pollution of bathing beaches by suspended matter from sewage or industrial wastes can be prevented, and bacterial contamination may be avoided, by re-location of sewer outlets.

3. That where protection of properly authorized bathing places, from bacterial contamination only, is required, such protection can be secured by such sewage treatment processes as will destroy or remove the bacteria.

4. That where properly authorized bathing places require protection against gross pollution arising from suspended or other objectionable sewage matters, this additional protection can be secured by the installation of such additional sewage treatment processes as will sufficiently remove the objectionable matters.

5. That since active bacterial contamination and gross pollution of bathing places can be prevented by proper location of such places and by proper location of sewer outfalls and proper

treatment of sewage and other wastes, the enforcement of the abandonment or re-location of bathing beaches or of preventive or remedial measures to protect such beaches will obviously depend upon a number of legal and administrative considerations of an economic engineering and public health nature which properly come within the jurisdiction of central authorities and the courts.

Conclusion.

Considerable misunderstanding and confusion exists as to what constitutes a nuisance or a menace to public health. These are questions of effect and intensity of pollution. They involve not alone principles of biology, chemistry and engineering, but also of law and psychology, the determination of which must be left to judicial and administrative bodies such as courts and state departments of health. It also appears to be a fact that whereas much may be accomplished in an endeavor to establish general limitations as to dilution, presence of organic matter, dissolved oxygen and other factors within which a nuisance or menace to public health may or may not be created, present knowledge of these relations is of such indeterminate and variable a character as to preclude definite formulation, and even were formulation possible, it could not usurp the offices of the courts and other judicial and administrative bodies in determining the facts and imposing remedies based upon such facts. It appears, therefore, that the code of regulations herein provided, goes as far as present knowledge of the subject warrants.

Harrison P. Eddy, *Chairman.*
Edwin A. Fisher.
Paul Hanson.
Theodore Horton.
W. H. Dittoe.

ANOTHER SHORTAGE OF SALVARSAN.

The indications are that the supply of salvarsan and neosalvarsan in this country has again reached the point of exhaustion. To the medical profession, who know the unfortunate results of a shortage of salvarsan on the health of the present and future generations, the situation is an exasperating one. Is there no remedy? Is our government impotent to relieve the condition? Congress made our patent law; it certainly has the power to suspend the patent on any preparation that the patentee is unable to, or does not, supply when such suspension is in the interest of public health. It is well known that at the time of the previous shortage the Dermatologic Research Laboratory of Philadelphia manufactured the product under the name of arseno-benzol.* It is presumed—at least hoped—that in the present shortage the laboratory will again manufacture the product. It should meet with no legal difficulty, as the agents for the salvarsan manufacturers have intimated that they would not object to such supply of the product at times when they themselves were not able to furnish it. But such a relief for the situation is not a permanent relief—it is a makeshift. Monopolies on medicaments such as diphtheria antitoxin, salvarsan and the like are against public interest. The United States has granted process and product patents on salvarsan: even if any one in this country produced a salvarsan product or derivative which would be more curative and more valuable—on account of being less toxic, for instance—the patentees could effectually prevent its manufacture and sale. Again it should be emphasized that the fact that a most important drug is unavailable is the result of an act of Congress, and Congress, has the power to modify its action so that the remedy may be made available.—*Journal of the American Medical Association.*

* A Canadian product, diarsenol, was also, and for that matter is still, available.

REPORT OF COMMITTEE ON REFUSE COLLECTION AND DISPOSAL.

Read before the Sanitary Engineering Section of the American Public Health Association, Cincinnati, Ohio, October 27, 1916.

SINCE the last convention of the Association in Rochester, in the fall of 1915, there have been a number of interesting developments in the practice of refuse collection and disposal. These developments are briefly reviewed herewith.

New Plants.

Among the interesting new plants built is one at Decatur, patterned somewhat after the new Hamburg plant in Germany, and designed to burn mixed refuse. This plant is one of the few mixed refuse incinerators built in small cities during the past year. The plan contemplates mixed collection of refuse from the houses.

Another interesting development which has received some attention in the press, is the garbage reduction plant at Pontiac, Mich, with a capacity of five (5) tons per day. For small towns interested in garbage disposal by reduction, this plant offers much of interest. It is located two (2) miles outside the city.

Of particular importance has been the growing interest in the new Cobwell System of garbage reduction. Plants of this type have been built at Los Angeles, Cal., the Panama Pacific Exposition, and New Bedford, Mass. A plant is proposed for New York City. The most interesting feature in the process is that the cooking, dewatering, de-greasing and drying of the garbage are carried out in one receptacle without exposure to the air. After the garbage is placed in the receptacle nothing is exposed to the air until the tankage is taken out ready for shipment. The chance for odors is thus largely reduced.

Many small incinerating plants have been built. There has been a uniform advance in the disposition of city officials to give more attention to the investigation and the preparation of plans and specifications in advance of construction.

Investigations.

During the year, a number of interesting special investigations of the refuse disposal problem have been made, and special studies have been continued at New York, and Chicago.

During the current year, investigations and reports have been made at Kansas City, Mo., Washington, D. C., and at Danville and Galesburg, Ill. A particularly important feature in these reports is the special attention that has been given to the collection part of the problem, both as regards the cost and location of disposal works, and the efficiency of the service as a whole.

Court Cases.

There have been several very interesting court cases on the question of garbage and refuse disposal. One of these, at San Francisco, on the question of fulfillment of guarantees

for a refuse incinerator is to come to trial. This case is similar to that which was on trial a year ago at Atlanta.

At Worcester, Mass., hearings have been held on the operation of the city pig farm for garbage disposal. Much interesting information has developed.

At Philadelphia, an interesting case came up regarding odors from the rendering plants along the Schulkyll River. The question of whether odors resulted from the sewage pollution in the Schulkyll River or the rendering plants formed a large part of the controversy.

At New York City, at present, there is much interest over the location of a large garbage reduction plant on Staten Island. The officials of the City of New York favor the undertaking, whereas the residents of Staten Island have combined in an attempt to prevent the location of the plant at this point. No settlement has been reached.

General.

As indicating recent progress, there are one or two general points of interest, to members of this association. The Michigan State Board of Health, for instance, have undertaken to make tests of all newly installed garbage plants, and where practical are having recording pyrometers installed at incinerators. This is a laudable attempt to improve the operation of garbage disposal works.

At Milwaukee, Wis., and Savannah, Ga., a considerable amount of steam has been generated at mixed refuse incinerators and made useful for other purposes in the municipality. At Savannah, steam is used at the water works pumping station. At Milwaukee, the steam is used for generating electricity, which has been sent several miles to a pumping station, which pumps lake water into the Milwaukee River for flushing purposes.

Further information from these sources can be secured by writing to the officials of the various municipalities mentioned or to members of the Committee.

Respectfully submitted,

Samuel A. Greeley, *Chairman.*
Rudolph Hering.
Wm. F. Morse.
E. R. Conant.
W. T. Knowlton.

WHY NOT TEACH FIRST AID?

Too many times when someone is injured in a factory there is a lot of confusion and running about, everybody advising and giving orders, and very likely no one who is able to give any real first aid.

Safety organizations in factories are helping this situation wonderfully, but wouldn't the good spread more rapidly if trade, technical, vocational and manual training schools included some actual training in first-aid—something more than posting in the electrical laboratory of rules to follow in case of electric shock.—*Factory*, April

PROGRESS REPORT OF THE COMMITTE ON VENEREAL DISEASES.

Read before the Public Health Administration Section of the American Public Health Association, Cincinnati, Ohio, October 25, 1916.

To the members of the Section:

YOUR committee has continued its work of collecting data upon meritorious experiments in dealing with the treatment and prevention of venereal diseases. As the material thus collected is largely available through correspondence addressed to the committee, or reprints which will be sent upon application, further reference to it is eliminated from this report. As an illustration of the various types of activities which are now being carried on with evident success the committee presents a series of charts upon the educational, diagnostic and treatment aspects of the problem. The conferences, correspondence and personal interviews which the members of the committee collectively have held during the year suggest the following points for consideration at this time:

1. That discussions of venereal diseases as a public health problem, be based on recognition of three essential factors—

(a) Discovery, treatment, instruction and control of infected individuals.

(b) Reduction of opportunities for dissemination by improvement of environment and limitation of infections by carriers.

(c) Instruction of uninfected individuals in methods of protection.

2. That the details of public health administration in relation to venereal diseases be considered under the separate headings:

(a) The eradication of syphilis.

(b) The eradication of gonococcus infections.

3. That the eradication of these diseases be always discussed with the scientific possibility of their ultimate eradication in mind, in order to safeguard such discussions and resulting lines of action from the errors of expediency and inconsistency.

In presenting these rather trite suggestions, your committee has in mind the difficulties of its members in freeing even its own early discussions from the prejudices and misunderstandings which arise from the complicated medical, social and moral aspects of the problem. If the first suggestion be adopted, prostitution and sex education must necessarily rank with reporting, diagnosis, and treatment as factors in the eradication of these last among the great uncontrolled plagues afflicting mankind. If the second suggestion be adopted, the preventive medicine phases of venereal diseases may be considered without conflict with the curative medicine phases related to dispensary and hospital management of treatment. If the third suggestion be adopted, administrative measures decided upon will mean permanent progress—no matter how slowly such progress may be recorded.

In presenting these suggestions,

your committee has purposely worded these "rules" for discussion so that the proponents, as well as the opponents of any of the administrative measures now on the firing-line, such as reporting of venereal diseases, the segregation and the medical inspection of prostitutes and the like may have equal opportunity to present their views. The committee's own views on many of these questions have been expressed in previous reports. As a concrete recommendation for the coming year, the committee proposes that each of the members of the section endeavor to arrange one joint meeting of the County Medical Society and Health Officials in his community for the discussion of this problem along the lines herein suggested, and that the data collected by the committee be utilized by the speakers selected for debate.

The resignations of the members of your committee are herewith tendered, with the recommendation that the committee be continued.

Respectfully submitted,

WILLIAM F. SNOW, *Chairman.*
WILLIAM A. EVANS.
JOHN N. HURTY.
JOHN H. LANDIS.
POWHATAN S. SCHENCK.

SECOND CLASS MAIL PRIVILEGES DENIED TO CITY HEALTH DEPARTMENTS.

From a note published in the *Weekly Bulletin* of the New York City Department of Health we learn that publications of *municipal* health departments are no longer to be carried at second-class rates of postage under the Act of 1912, the postal authorities having decided that the terms of this act limit this privilege to publications of *state* departments of health. Attempts made by the New York City health authorities to secure an amendment of the postal laws were only partially successful; the amendment was adopted by the Senate but failed of adoption by the House.

This is a matter vitally concerning health officers throughout the country. Published, as they are, to promote the public health, and carrying no advertising matter of any kind, health bulletins of municipal health departments should be entitled to the same mailing privileges accorded to the bulletins of state health departments. It is a short-sighted policy, and false economy of the rankest kind to curtail the dissemination of public health bulletins. The few dollars saved to the postal service will be insignificant compared to the loss to the people by preventable diseases, occurring because health bulletins were not distributed.

If the interpretation put on the present laws by the U. S. postal authorities is correct, Congress should at once take steps to right a ridiculous situation. The people cannot afford to do without the excellent bulletins issued by municipal health authorities throughout the country, and it is manifestly unfair to ask the various cities to carry the burden of mailing these bulletins at regular postage rates. We urge our readers to work for second-class mail privileges for city health departments.

METHOD OF DISTRIBUTING AND COLLECTING DIAGNOSIS OUTFITS FOR THE BUREAU OF LABORATORIES IN CLEVELAND.

R. G. Perkins, M. D.,
Bureau of Laboratories of the Cleveland Division of Health.

Doctor Perkins tells how one feature of health department routine is carried out in one of our large cities. This is a well written paper which will prove of particular interest to laboratory workers and communicable disease men.

CLEVELAND is a city with a present population of over 650,000 (1916 estimate), and an area of about 52½ square miles. The Health Division is situated at about the center in an east to west direction, but almost at the northern border, so that the outlying districts to the south are about four miles away, and those to the east and west about six to eight.

In a city so spread out it is clear that there must be a number of places at which the various outfits are accessible to physicians, and ever since the beginnings of the laboratory there have been branch stations in which a number of these were kept on file. These were established at the police precinct stations, of which there are fourteen for the twenty-six wards, and at such drug stores as agreed to care for them. It was the custom to have the branch stations telephone in whenever there were any used outfits left in their charge or when the supply of unused outfits was running low. This custom, however, was more honored in the breach than in the observance, and it was not infrequent to have specimens delayed one or two days before reaching the laboratory. This caused justifiable complaints, and it became obvious that improvement was necessary.

The present plan has been in use for three years and has proved eminently satisfactory, and will be continued. The arrangement is as follows:

Branch stations are established at all the fourteen police precinct stations, and at 18 drug stores scattered over the city in localities convenient of access to the physicians of that district. In each of these is kept a constantly adequate supply of the various outfits in use by the laboratory. These may be obtained by physicians or on their order, and in each case the physician must receipt for the outfit by its laboratory number, so that it may be known where outfits are when they do not return to the laboratory. The outfits at present in use cover diphtheria, typhoid, tuberculosis, gonorrhœa and syphilis. With regard to all except diphtheria it is clear that a delay of a few hours is not vital, but in that disease rapid diagnosis is essential. Even when the outfits were brought to the laboratory as soon as

possible after notification, it was necessary to incubate the cultures, so that it was often impossible to get a diagnosis within twenty-four hours. It was therefore decided that incubators should be established at the police stations so that cultures deposited in them at any time in the afternoon or evening would have been incubated over night and would be ready for immediate diagnosis. It was of course impossible to establish incubators at the drug store stations, but this difficulty has been surmounted in a fairly simple and inexpensive manner. It has been arranged with the great majority of the sub-stations that they will send over each evening to the nearest police station all such outfits as may have been left at them during the day, and see that the diphtheria outfits are placed in the incubator. For this service a small messenger fee of from ten to fifteen cents is paid on presentation of a monthly statement as to the dates and the outfits sent over. By checking this with our own records, showing which stations the outfits came from, it is easy to avoid false charges, and indeed since the system was started we have found no such attempt. On the lists of sub-stations sent to each physician in the city we have noted such as are unable to offer messenger service to the police stations, so that if an early diagnosis is desirable, the physician can take the outfit to the nearest place where the service is complete. There is a steady increase in the number of physicians who take their diphtheria outfits to the nearest police station and put them in the incubator personally, thus adding to the assurance of prompt service and reducing the bills for special messenger service.

Every morning at about six o'clock the laboratory messenger starts on a round of the police stations, from each of which he collects all the outfits that have been used, replacing these or any which have become defective for any reason with new ones, and recording the temperature of the incubator as well as other conditions which may seem advisable. He records in his book the numbers of the used outfits and the numbers of any outfits left, making a current record which gives a complete check.

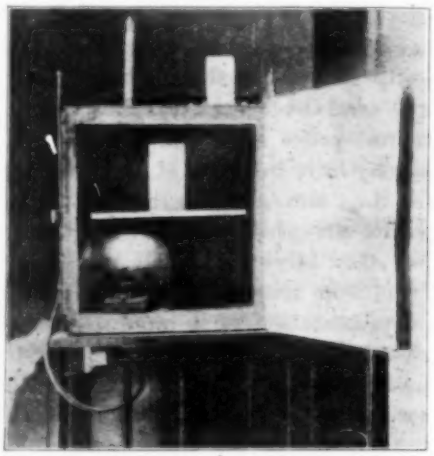
At the ordinary rounds the sub-stations other than the police stations are not visited, but in the afternoons another trip is made when it is necessary to fill out the supplies at such stations. No diphtheria antitoxin is left in any of the drug stores, but an adequate supply is kept at each police station. This is again of benefit in that the physician in a suspicious case will usually bring in his culture to the police station incubator when he comes for the antitoxin, which is distributed free of charge by the Health Division.

The total mileage necessary for a visit to each of the stations is about sixty a day, and by the method above outlined it is possible to have one messenger collect all the outfits from both the East and West Sides and get them to the laboratory early enough to have the diphtheria diagnoses telephoned before the lunch hour. The other outfits are examined after the diphtherias are disposed of.

In this way a physician can take a culture up to midnight and get a diagnosis by lunch time, a great improvement on the former system.

The outfits are of the usual types, and each contains an unstamped return postal card, on one half of which the physician fills out the usual brief history, the other half being filled out by the laboratory and mailed to his office. In diphtheria cases, those sent in for diagnosis are telephoned; those for release are not, but postal cards as above are sent in both cases. There are two marked advantages in this scheme over the soft folded blanks which are answered by a separate sheet filled out in the laboratory. In the first place the laboratory number is stamped on each half of the return cards, and these are not separated until the positive or negative stamp (the former in *red ink*) is applied to *both*, thereby avoiding any possible error, and in the second place they are much more convenient for filing, and much more accessible. A live file of all cases under quarantine is maintained, so that at any minute the total of these, their distribution, and any other points about them, may be easily obtained.

A description of the incubators may be of value, as this would appear at first sight to be a great expense. They were built from our specifications by a local sheet metal worker as follows: They are made of galvanized sheet iron, with double walls one inch apart, the intervening space being filled with mineral wool, and the outside walls at the top and back allowed to project about two inches, making a safe shelf for the typhoid and tuberculosis outfits. In the center of the top is a $\frac{3}{4}$-inch hole for the thermometer, and a similar hole $\frac{1}{2}$ inch above the *inside* bottom for the electric wires. The available inside dimensions are 11 inches in height, 10 inches in width, and 9 inches from the front to the back. Five and one-half inches from the bottom is a shelf of perforated sheet iron so arranged as to leave about one-half inch front and back for air circulation even when the incubator



is filled. This will hold 35–40 of the diphtheria outfits used by this laboratory. The hearing element is a 4–8 candle power carbon lamp, fitted to an ordinary wall rosette, and the temperature is controlled by the familiar Manhattan thermostat, of metal and hard rubber. An extra piece of sheet metal is fastened under the shelf so as to shield the lamp. The expense to us three years ago was $39.00 for 14 incubators, including everything except the lamp itself, the regula-

tor, and the thermometer. The thermometers were selected from ordinary dairy thermometers standardized against the laboratory thermometer, and cost $10.25 apiece; the regulators cost $0.72 apiece, and the total expense of each outfit complete was less than $5.00. The current used in each incubator costs about one and a half cents a day. These have now been in service for three years and are as good as new. There are occasional variations of two to three degrees, but as a usual thing the variation is one degree or less. We set them at 36° C. so that with this variation the only probable danger is from insufficient heat.

The weakest point in the series is of course the actual collection. We find, however, that with one messenger and a motor car we are able to accomplish both collection of used outfits and distribution of fresh outfits satisfactorily in the time allowed. We, however, found that unless a fairly adequate scale of wages is offered, it is difficult to get a man who will be conscientious and who will drive the car in a conservative manner. We tried a three-wheeled motorcycle at first, but this was proved unsatisfactory, as with the three tracks it was impossible to avoid ruts and holes in the pavements. We would recommend, therefore, that a small motor car be used for this purpose.

The statement mailed to each physician with a list of the sub-stations is appended, together with a photograph of one of the incubators now in use.

CITY OF CLEVELAND

DIVISION OF HEALTH

Bacteriological Laboratory

City Hall

In order to render earlier reports and increase the efficiency of the diagnostic work of this laboratory, the method of collecting diphtheria, typhoid and sputum specimens has been modified.

Outfits will be kept at the drug stores named in the accompanying *revised* list, and *no collections* will be made from these by the laboratory messenger. Arrangements have been made with the druggists to deliver *each evening* to the nearest police station such outfits as have been left with them by the physicians.

Incubators have been *placed in each police station* indicated in the list given herewith. *The laboratory messenger will call each morning at the various police stations to collect outfits.*

Diphtheria cultures placed in these incubators (typhoid and sputum specimens should be placed on top and *not inside* these *incubators*) as late as midnight should be ready for microscopic examination at the laboratory the next forenoon. Physicians can facilitate the work by leaving their specimens so far as possible at the police stations.

NOTE: The outfits supplied by the Health Division *are to be used in sending specimens to the city laboratory only*, and *not for private use.*

Persons found misusing these outfits will be required to pay for same.

Books Reviews.

Water Works Handbook. *Alfred Douglas Flinn, Robert Spurr Weston and Clinton Lathrop Bogert. McGraw Hill Book Co., New York: 1916. Pages 824, illustrated. Price $6.00 net.*

This work is, according to its authors, "a compilation of information old and new for the waterworks engineer and superintendent, the designer, constructor, operator and inspector." It is in fact a most useful and usable compilation of a large amount of practical material and as a source of ready reference for one interested in waterworks will prove most valuable.

In the progress of sanitary science it is becoming increasingly evident that those in official charge of the health of a community must come into somewhat intimate contact with the community's water supply. Health officers should, therefore, have some familiarity with the general problem of water supply and the more intimate their knowledge of certain details of this important phase of community life the better are they able to perform their specific function of guarding the community's health. The present review, therefore, will deal in the main with those matters which are of particular importance to the health officer.

The work is divided into five parts dealing respectively with the sources, collection, transportation and delivery, distribution, and character and treatment of water. The discussion of rainfall and of ground water in the opening section is of practical interest in that it furnishes a very satisfactory foundation for a proper appreciation of uses and dangers of wells and springs. The subject of wells is considered more at length under the general heading of collection of water where the details of well construction and testing will be found. The parts of the work dealing with transportation and distribution of water contain a great deal of technical information, some familiarity with much of which would enhance the value of a health officer's services. His chief interest, however, will be directed toward the last part dealing with the character and treatment of water. Here he will find in most compact and thorough arrangement a discussion of properties and classification of waters with numerous examples of chemical and bacteriological results classified by types of water and by sources. The all important subject of wells and ground water supplies is again dealt with more particularly from the hygienic standpoint and the tabulated data include several references to algae in waters and a discussion of the associated matter of odors. Specimen analyses of the waters of American rivers, of some foreign rivers, of rain, snow, springs, wells and ice, and of the waters of the seven seas are given in tabular form. The chapter upon inspection of sources is particularly valuable and includes copies of rules and regulations for the protection of watersheds adopted by the cities of Boston and New York and a specimen contract for the supervision of labor camps upon watershed drainage areas. Storage as a purifying mechanism is discussed at length with special reference to the effect upon bacteria, color and turbidity. A brief treatment of the general principles of water purification by the various accepted types of treatment follows, especial emphasis being given to chemical disinfection and automatic feed apparatus for various chemical treatments. A chapter upon water softening deals both with the desirability and methods of applying this treatment.

No special search has been made by the reviewer for errors or misprints, but the term "phenol equivalent" upon page 675 will be readily understood by any health officer as having been intended for phenol coefficient. Table 224 upon the same page also contains an obvious error in recommending the use of a 2 per cent. solution of disinfectant in sufficient quantity to give a 2 per cent. mixture of the disinfectant in the final mass. This error is repeated several times in the table.

The health officer will find in this work a great deal of information which he frequently requires and which through his lack of familiarity with engineering literature he generally finds difficult to obtain. The style of the book is midway between that of a manual and the abbreviated style of the engineer's pocketbook; the arrangement, always a difficult matter in works of this kind is reasonably harmonious and consistent and is assisted by an extensive and detailed index.

Earle B. Phelps.

Microbiology. *Edited by Charles E. Marshall. Second Edition. P. Blakiston's Son & Co. Philadelphia, 1917. Pp. 861. Cloth, $3.00 net.*

The second edition of Microbiology edited by Prof. Charles E. Marshall, Professor of Microbiology and Director of the Graduate School of the Massachusetts Agricultural College, Amherst, Massachusetts, will be welcomed by both teachers and students of this important study.

The subject is a large one to be handled in a comprehensive manner in a single volume but this has been accomplished by careful attention to the subject matter and the elimination of all superfluous matter.

The names of the collaborating authors, of whom there are twenty-five, furnish in themselves a proof of the excellency of the work. The list of these contributors, each a recognized expert in the subject he presents is as follows:

F. T. Bioletti, Berkeley, Cal.; R. E. Buchanan, Ames, Iowa; M. Dorset, Washington, D. C.; S. F. Edwards, Lansing, Mich.; E. Fidlar, London, Ontario; W. D. Frost, Madison, Wis.; A. Guillermond, Lyons, France; N. Mac L. Harris, Chicago, Ill.; F. C. Harrrison, Quebec, Canada; E. G. Hastings, Madison, Wis.; H. W. Hill, London, Ontario; W. E. King, Detroit, Mich.; J. G. Lipman, New Brunswick, N. J.; W. J. MacNeal, New York, N. Y.; E. F. McCampbell, Columbus, Ohio; Z. Northrupp, E. Lansing, Mich.; E. B. Phelps, Washington, D. C.; O. Rahn, Elbing, Germany; L. F. Rettzar, New Haven, Conn.; M. H. Reynolds, St. Paul, Minn.; W. G. Sackett, Fort Collins, Colo.; W. A. Stocking, Ithaca, N. Y.; C. Thom, Washington, D. C.; J. L. Todd, Montreal, Quebec; E. E. Tyzzer, Boston, Mass.

The text has been divided into three distinct parts, the first dealing with the morphology and culture of microörganisms, including molds, yeasts, bacteria and protozoa.

The second part deals with physiological problems, such as the nutrition and metabolism of microörganisms and the effect of physical or chemical influences.

These two considerations pave the way to the third and major portion of the book which deals with applied microbiology as related to the problems met in the study of professional or practical affairs.

This portion of the book has eight divisions, each composed of several chapters, and presenting in detail such important subjects as Microbiology of Air, of Water and Sewage, of Soil, of Milk and Milk Products, of Special Industries, Microbial Diseases of Plants, Microbial Diseases of Insects and Microbiology of the Diseases of Man and Domestic Animals.

The whole subject matter as presented in the first edition has been thoroughly revised and rearranged, there are several new contributors and much new material has been added. There are 184 illustrations as contrasted with 129 in the first edition, the book is printed with good, readable type, is well bound and of convenient text-book size.

Francis H. Slack, M. D.

Personal Hygiene and Physical Training for Women. *By Anna M. Galbraith, M. D., Second Edition. The W. B. Saunders Company, Philadelphia. 12mo of 393 pages, illustrated Price $2.25.*

The first edition of this work has been favorably reviewed in this JOURNAL. Attention may be called again to its great value especially in the hands of teachers of young women and girls. While it is a book of moderate size it is remarkably inclusive. Much that is written on personal hygiene seems to the average reader to be a repetition of platitudes; in other cases it enforces a peculiar point of view and fails to be convincing. The present treatment is a happy one: the matter set forth is not too obvious to be interesting and at the same time it is not at all eccentric. A historical method is followed with advantage in the discussion of dress, physical training, and education for women.

Doctor Galbraith places emphasis upon posture as related to health. This contrasts decidedly with Doctor Cabot's recently printed opinion that the value of good posture is chiefly psychological—an opinion which surprised the reviewer. The subject of nutrition is well handled though it may be remarked that 100 grams of protein a day is a high estimate for an American student. The chapter on Mental Hygiene is sane and helpful.

Percy G. Stiles.

Food Study. *By Mabel Thacher Willman. Little Brown, and Company, Boston, 1917. pp. 324. $1.00.*

This book is one of the best of the recent text-books on foods for high school students. The material is clear, direct and up-to-date. The author even dares to suggest that hard boiled eggs may be digested and that alum baking powders are not injurious. The reader is somewhat startled at the unconventional order of presentation of subjects, but examination shows that the author has a logical sequence of her own which is rather pleasing. Some of the subjects are introduced by experiments which are for the most part skillfully applied. Following the essons are references and questions to stimulate further thought and reading. This feature would make the book acceptable to home study clubs. The appendix contains some material on food requirements and h list of additional dishes to illustrate the principles taught in each chapter of the book. Recipes for these dishes are not given because the author believes that every girl should know how to use a cook-book as well as to be somewhat independent of the printed recipe because of a knowledge of principles. A trial of the book as a text would be stimulating and refreshing to the high school teacher.

Ula M. Dow.

Department Reports and Notes

REPORTS

Los Angeles, California

Based upon an estimated population of 500,000, the Annual Report of the city of Los Angeles for the year ended June 30, 1916, records a mortality rate of 12.10, an increase of 313 deaths over the previous reported year. In the rate are included deaths of the many non-residents who had taken advantage of the city's excellent hospital facilities. Of the 140 suicides it is rather astonishing to note that only 5 were born on the Pacific coast, 60 being foreign born, and 75 being born in the Atlantic states. Three hundred and twenty seven deaths were caused by accidents.

Five hundred and sixty-two deaths occurred in children under 1 year of age, making 9.28 per cent. of deaths from all ages, a rate of 72.45 per 1,000 living births; 99 or 17.61 per cent. of these deaths were due to diarrhea and enteritis; 125 due to premature birth; 98 due to some form of pneumonia. Three hundred and ninety-two less living births were reported than during the previous year, due, it is believed, to non-reporting by physicians and midwives. Nurses were detailed to investigate the cause of this, and it is expected that such reporting will be improved during the present year. The report of the Division of Obstetrics, under Dr. L. G. McNeile, shows most active work being carried out along the lines of maternity dispensaries, two of which are established, prenatal care both in the dispensaries and in the home, care during delivery, postnatal care, the furnishing of complete baby clothing outfits, and maternity nursing, which well account for the very commendable low infant mortality rate. These activities were further aided by the issuance and wide distribution of pamphlets in English, German and Spanish on "Advice to Prospective Mothers."

To the department there were reported during the year 2,610 cases of tuberculosis, 383 of which were not reported until death; 717 of these were reported from the county hospital. Nine hundred and ninety-eight, or 16.48 per cent. of all deaths, were reported from this disease, 115 of which were of natives of the city and 38 natives of the state outside. This is indeed a problem for this city, a problem which the department of health has not shirked. Active and efficient administration has been directed along this line and has resulted in the establishment of four tuberculosis clinics, and the maintenance of two half time assistant health commissioners, and a number of tuberculosis nurses, who not only conduct the clinics but visit indigent patients, who are unable to come to the clinics, at their home. Complete coöp-

eration exists between the department and the Los Angeles Society for the Prevention of Tuberculosis. The reports of the individual clinics furnish conclusive evidence as to the effectiveness of the department's endeavors.

Fifty-one cases of smallpox were reported, 37 of those infected never having been vaccinated, and 10 being vaccinated in childhood. No deaths resulted. Six hundred and eighty-four cases of diphtheria were reported with a case fatality of 4.37 per cent., or 6 per 100,000 population. Three hundred and twenty-four cases of scarlet fever were reported with 2 deaths. There occurred 21 cases of poliomyelitis with 2 deaths. Nineteen cases of cerebro spinal meningitis were recorded with 14 deaths. Of the 8 cases reported as cerebro spinal fever, or epidemic form, 5 received the Flexner serum, one dying. One thousand two hundred and eighty-eight cases of chicken pox were recorded, and here too, we find evidence of the negligence of the public in regard to this disease. Five deaths from measles were reported from 668 cases. One thousand two hundred and eighty cases of whooping-cough resulted in 25 deaths, a case fatality of 1.95 per cent. The department intends during the present year to put in force a quarantine or placarding of houses where this disease exists. Eight hundred and fifty-four cases of venereal disease were reported, 372 more cases than reported for the previous year—a good sign of improved reporting.

Increased activity is to be noted in the report of the laboratories due to a greater activity of the milk inspection division in collecting samples and special investigations. The division of milk inspection reports most interestingly on the conditions of the dairies and cows included in this city's milk shed and shows that a high standard is being maintained in this connection. In scoring the dairies it is shown that an average of 60.3 was obtained, an increase over the previous year of more than four points. Inspection of meat, restaurants and bakeries has been conducted by a force of ten inspectors whose work has proven most satisfactory. The division of sanitary inspection has been active in trapping and poisoning rats and squirrels, a preparatory measure in preventing the spread of any disease conveyed by rodents which might possibly be introduced in certain localities. Considerable nuisance abatement was affected though this problem has been rendered most difficult by personal spite between neighbors, and ignorance.

In the matter of school inspection the 120 city schools are divided into six districts and one nurse assigned to each district. In this manner it has been found possible to inspect each child individually, treating where necessary and doing other health conservation work. Though the work for this division has materially increased due to annexation the force has remained as before.

The main features of the interesting report of the Bureau of Municipal Nursing is the increase in the number of tuberculosis clinics, particularly the opening of a children's open air clinic; and the experiment of creating a small district in which one nurse shall do all the work—district, school, and tuberculosis.

The expenditures of the department amount to $146,500. The financial statement represents a complete statement of functional activities and shows a wise proportion of expenditures.

The report as a whole, like most of our Pacific coast reports is exceptionally well prepared, well illustrated, and complete. The work itself is set forth with a nice regard for sequence and relative importance of the many activities reported and is one of the few reports of this nature which would interest the laymen, which indeed is its function. Health Commissioner Powers is indeed to be congratulated upon this report as well as upon the excellent showing of the activities of his department as described in it.

Cumberland, Maryland.

The Seventh Annual Report of the Department of Health of this city of some 26,000 inhabitants first calls attention to four excellent new activities instituted during 1916, which, it is stated, have already justified their installation. Briefly these are: The employment of a trained man to supervise the production and sale of milk, culminating an effort of several years' standing, which by the improvement of dairy scores and laboratory examinations, and possibly by the reduction of deaths from diarrheal diseases in children under two years of age

proves itself most worth while; the issuance of a monthly bulletin of excellent quality, which has done much in educating the general public and extending their appreciation of the health department's activity; the monthly scoring and rating of bakeries and restaurants, which has tended to secure greater patronage for those establishments which maintain sanitary conditions; the establishment of a plan whereby senior nurses of the Allegany hospital will spend a month or more in visiting new born babies and in instructing mothers in the proper care of infants, which should do much to reduce the somewhat high infant mortality rate reported during the year.

The mortality rate of 12.77 per 1,000 population reported for 1916 is in excess of that for 1915, due, it is believed, to the results of measles and influenza, which reached epidemic proportions, especially in the case of measles, of which there were reported 1,125 cases with seven deaths. In this connection, possibly a direct result of the monthly health bulletin can be detected from the fact that over half of these cases of measles were reported to the department by the parents. Fifty-seven cases of diphtheria were recorded with a case fatality rate of 10.5. Epidemiological studies were made of the school children with the detection of a surprising number of carriers. Upon exclusion of these carriers from school and proper isolation, the outbreak of this disease soon subsided. Thirty-four cases, mostly "mild," of scarlet fever were reported with no deaths. Typhoid fever gave the lowest rate on record for this city, 50 cases with three deaths being reported. The reduction of disease from this cause in this city since 1913 has been most striking. Two hundred and twenty-six doses of typhoid vaccine were administered during the year. Ninety-one cases of tuberculosis with 26 deaths within the city were reported. Poliomyelitis remained normal. Whooping-cough caused three deaths. A serious increase was recorded in the infant mortality rate, 112 per 1,000 births. The department realizes that this is the most important problem on its hands, and remedial measures are under way which should do much to improve the existing conditions. While professing belief in the principle of supplanting fumigation by thorough cleansing, Mr. Max Colton, health officer, has not as yet been able to win over public opinion sufficiently to take this more advanced step.

The effect of the appointment of the milk and dairy inspector in August of 1916 is well exhibited by his report which states that in August only 17.54 per cent . of the dairies rated had a score above 50, while in December 55.34 per cent. scored above 50. The quality of the milk has also greatly improved.

It is unfortunate that a detailed financial report can not be included in this report, for it would be interesting to note the functional expenditures of the department which maintains such diverse activity on an appropriation of $5,000.

The recommendations made deal to a great extent with the sanitation and hygiene of the outlying districts. Specific recommendations call for two public health nurses and one veterinarian for meat inspection, which would necessitate nearly doubling the present appropriation.

Norristown, Pennsylvania.

"A few facts worth knowing told in a line" is the title of one of the preliminary pages of the 1916 Report of the Department of Health of this city of 32,000 population, and in it are concisely stated the records for the year as reported by the department. In it we are told that the death-rate, excluding "violent deaths," was 12.03, 61 more deaths than reported in 1915, with an average age of death of 39 years.

Eighty-three deaths resulted from reportable diseases. Of the 893 cases of contagious diseases reported, 613 were cases of measles, 88 of diphtheria with 11 deaths, and 7 of scarlet fever. Poliomyelitis was reported 19 times, with 2 deaths. Typhoid fever was reported 41 times, an increase of 18 over 1915. It is thought that such an increase was due to an infected milk supply. One hundred and three deaths of infants under 1 year of age were recorded, which would give the high infant mortality rate per thousand living births of approximately 151. The expenses for the department for the year amounted to $2,507.

Among the repeated recommendations of the department are: A public convenience station; a public dumping ground, properly looked after; a contagious disease hospital; enforcement of the spitting law; cleaner street; and employment of a dog catcher regularly.

The report itself is extremely brief and incomplete. No rates are furnished, and beyond "drastic measures" no indications are given as to the department's activities in conserving health. An interesting sidelight is thrown on the expenditures of the department, when it is stated that over 20 per cent. of the expenditures were used for the employment of special quarantine officers to enforce quarantine in a number of cases of infant paralysis.

NOTES

Typhoid Fever in the Large Cities of the United States.—The *Journal of the American Medical Association* presents its fifth annual report of the typhoid fever mortality in those cities of the United States having over 100,000 population. The cities reported number sixty, and are grouped as previously, according to size. The first group includes cities over 500,000, and is led by Boston which reports 3.5 deaths per 100,000; New York is second with a rate of 3.8; and then follows Chicago, 5.2; Cleveland, 5.3; Philadelphia, 7.8; Pittsburg, 8.6; St. Louis, 9.4; Detroit, 15; Baltimore, 18. All but St. Louis, Philadelphia and Detroit show improvement over 1915, and all show improvement over the 1911–1915 average.

The second group includes those cities with populations between 300,000 and 500,000, and is led by Seattle with a rate of 3; then follows Los Angeles, 3.1; Cincinnati, 3.4; San Francisco, 3.4; Newark, N. J., 5.3; Minneapolis, 5.8; Buffalo, 10.9; Washington, D. C., 12.6; Milwaukee, 14.9; New Orleans, 23.4. The most serious increase is noted in the case of Milwaukee, which in 1915 reported a rate of 4.5. The increase was due, it is believed, to a general water carried infection in the first part of the year. San Francisco, Cincinnati and Los Angeles gave the most marked improvements.

The third group (cities from 200,000 to 300,000 population) was led by Portland, Ore., with a rate of 4.6; St. Paul reported a rate of 4.9; Providence, R. I., 5.1; Rochester, N. Y., 5.1; Jersey City, 6.8; Denver, 7.2; Louisville, 9.7; Kansas City, 10.6; Columbus, 13.4; Indianapolis, 26.6. The rates on the whole are somewhat like those for 1915, with the exception of St. Paul, Providence, and Louisville which showed marked inprovement. Indianapolis suffered a particularly bad typhoid year, due to an outbreak in January and August. Louisville reports the lowest rate yet reached by a southern city.

Paterson, N. J., led group 4 (cities from 125,000 to 200,000) with a low rate of 1.4, the second lowest recorded for the country; next followed Spokane with a rate of 2; then Worcester with 3.7; Oakland, Cal., 4; Omaha, 5.1; Scranton, 5.4; New Haven, Conn., 8; Fall River, Mass., 10.9; Syracuse, N. Y., 12.2; Atlanta, 17.9; Toledo, 22.9; Richmond, Va., 24.1; Memphis, 36.3; Birmingham, 42.6. The group as a whole exhibited many fluctuations, Birmingham, Richmond and Memphis being the worst sufferers, milk seeming to cause the greatest difficulty. A great improvement in the rates of the southern cities is looked for during the next several years. Spokane, Worcester, Oakland, Scranton and New Haven showed marked reductions.

Group 5 (cities from 100,000 to 125,000) was led as last year by Cambridge, Mass., a city which reports a rate of only 0.9, the lowest rate ever reported by a city in this country, and with a remarkably low three-year record. The report states that no other city of its size in the world has ever reported such a low rate, as far as is known. Tacoma, Wash., is second with a rate of 3.5; then comes New Bedford, Mass., with 4.2; Springfield, Mass., 4.7; Trenton, N. J., 6.3; Hartford, Conn., 6.3; Albany, N. Y., 7.7; Bridgeport, Conn., 9; Salt Lake City, 10.2; Camden, N. H., 11.3; Lowell, Mass., 11.4; Dayton, O., 14.7; Grand Rapids, Mich., 15.6; San Antonio, Tex., 16.0; Reading, Pa., 18.7; Nashville, Tenn., 27.3; Dallas, Tex., 27.5. Tacoma, New Bedford, Springfield, Hartford, and Albany report notable decreases, while Camden and Salt Lake City show considerable increases over 1915.

Thus of the sixty cities reported, some 26 per cent. show rates under 5.0; 31 per cent. between 5.0 and 10.0; 30 per cent. between 10.0 and 20.0;

and 13 per cent. above 20.0. And the average from typhoid fever per 100,000 population for these sixty cities representing a population of 24,667,919 (estimated by U. S. Census Bureau methods) was 8.1.

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Additional Public Health Legislation Suggested for New Jersey.—Believing that the foundation of all good official public health work is good law, and that the final responsibility for the efficiency of the department of health rests with the legislature, the 1916 annual report of the Department of Health of New Jersey contains a number of recommendations for additional legislation, mostly of the form of correcting or supplementing existing laws. An excellent summary of these recommendations is contained in the February *Health News* of the Health Department of New Jersey.

The first recommendation tends to correct the 1915 law reorganizing the department, and to fix more precisely and satisfactorily the duties of the director and the appointed bipartisan board of eight members. At present the board must concern itself with a mass of administrative detail which might well be done by the director, but which it must do under provision of the existing law.

The present procedure for the control of local boards of health by the state department is too complicated and time-consuming, hence it is advocated that the state department be permitted by law to take charge of a local board in cases of emergency, to require the members of such boards to carry out its orders, and to penalize them if they refuse to do so.

Provision is also requested by which the state department for cause, and after a proper hearing can remove a local health officer for incompetence or failure to perform his duty.

It is recommended that employees of the state department be invested with the power and authority of constables.

It is recommended that the various laws dealing with the reporting of various diseases be amended so as to make the procedure as uniform, simple and easy as possible, and do away with the present confusion in regard to this matter.

It is recommended that an act be passed transferring, in all cases, the vital statistics to the local health boards.

It is recommended that the state department of health be permitted to divide the State into a certain number of sanitary districts, preferably five or six, and to provide for a health officer in each district, who would be an employee of the state department.

Upon economical grounds it is advocated that the law requiring that an annual report of the state department of health be sent to every physician, be amended so that the annual report will be replaced by the department's monthly bulletin.

In order to offset the tendency of the last few years on the part of the legislature to impose on the state department a number of duties which properly should be done by local boards, such as the licensing and inspection of factories where ice cream is made, etc., which seriously interferes in the efficiency of the department, it is advocated that work which is purely local be done by the local boards.

It is recommended that an act be passed permitting the state department by resolution to require that permits must be secured by the owner of any establishment where food stuffs are handled or produced, and that a reasonable fee may be fixed by the department for the issuing of such permits, and that all permits shall be issued annually.

Further changes suggested deal with a change of legal procedure in food law; the power of water departments and companies to protect their supplies; the empowering of the state laboratory to make analyses for private individuals under certain conditions, and to fix fees; the examination of food handlers; the change in the law regulating moving picture booths; the advancement of money for state use by employees; the prohibition of preparations containing narcotics for infants.

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Council or Commission Control of Health?—"Whether the control of the centralization of all municipal health activities in Minneapolis shall rest in the hands of the mayor or of the City Council has brought a sharp clash between the Legislative Committee of the council and a Citizens' Committee which was appointed through the council several months ago to make a scientific study of the health system of the city and to draw up a bill embodying the results of its study," states the *Survey* for March 24.

It seems that the bill proposed by the Citizens' Committee provides for the creation of a board of public welfare of seven members, consisting of the mayor and the president of the City Council *ex-officio*, and five others appointed by the mayor, one each year for the term of five years, this board to have entire charge of the protection and preservation of health, the care and management of the hospitals, relief of the poor and the management of all penal and correctional institutions. The medical inspection and promotion of health as carried on by the Board of Education in the public schools was to be exempt.

At the hearing before the Legislative Committee of the council, the council declared the report of the Citizens' Committee to be unfit. A substitute bill was drawn up by the council and was unanimously adopted, which provided that all such work as outlined by the Citizens' Committee should be entirely under council control, with the power of appointment of a general superintendent of health and all other officers and employees thought necessary, the latter to be under civil service.

The *Survey* states that the resulting debate brought out the fact that the city of Minneapolis has one of the least efficient health systems in the country with a per capita expenditure for health work of about thirteen cents. It is stated further that "The department, which at the present time is under council control, does no educational work, there being no funds available for that purpose. Its nursing service is inadequate, the nurses of the tuberculosis division being so crowded with work that they give no bedside care; there are no nurses available for infant welfare or contagious disease service.

"The whole system itself was shown to be antediluvian, consisting of three distinct departments, each responsible to independent boards. First, there is the Health Department with an under-paid commissioner, and an annual budget of less than $65,000, the whole department being under the control of the Health and Hospitals Committee of the City Council. Since, during 1916, the council could not agree upon a commissioner, the city was without one, having only an acting officer. Second, the hospitals, workhouse and relief department are under the Board of Charities and Corrections, a board appointed by the mayor. Third, the health work done in the schools is under a third distinct head, the Board of Education. Thus, like all Gaul, the health work is divided into three parts."

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A Public Health Agent in Massachusetts.—"In line with the Massachusetts precedent of taking the lead in public health work, is the step taken by the Massachusetts Medical Society in deciding to coöperate actively with the public health movements of the State," comments the *Boston Medical and Surgical Journal* for March 22 in speaking editorially of the employment of an agent by the Society under the direction of the Committee on Public Health. The movement had its beginning in the winter of 1914 when a number of physicians and social workers met to discuss methods of stimulating the interest of the public in health matters—each member of the group being interested in a different phase of the work yet all desirous of determining the best manner in which to give to the public reliable information on medical and hygienic subjects.

It was decided that the organization best suited to disseminate such information and to improve the existing conditions was the State medical society. Accordingly in 1915 at the annual meeting of the society it was moved that a committee be appointed by the Council on Public Health "for the purpose of hiring an agent who shall, under the direction of the Massachusetts Medical Society, assist in the dissemination of information and in the carrying on of any function of the society in public health work, legislation, social service, or similar departments of effort." The action was deferred a year, and in June 1916, the special committee voted that such an agent be employed. Mr. E. A. Ingham of the Department of Biology and Public Health of the Massachusetts Institute of Technology was selected as agent for the society. The basis of the work to be followed out by Mr. Ingham is as follows: "1. To stimulate the interest of the medical profession in Massachusetts in sanitation, hygiene and preventive medicine. 2. To stimulate the cities and towns of Massachusetts to employ full-time health officers. 3. To stimulate better work in medical inspection of schools, infant mortality, pre-natal work, district nursing, anti-tuberculosis work, industrial hygiene, sanitary engineering, and the prevention of the common communicable dis-

eases. 4. To investigate the health conditions of the state with reference to public health work."

Mr. Ingham's activity up to the present time has been largely devoted toward stimulating cities and towns of the state to the employment of full-time health officers and public health nurses.

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Bills on Public Health and Hygiene.—The *Survey* for March 10 under the department devoted to Social Legislation presents an excellent summary of the many bills before the state legislatures throughout the country which deal with public health and hygiene. Lack of space in these columns prohibits as complete a review of this summary as is desirable. However, a few of the main features may be enumerated here.

A bill is before the New York legislature establishing definite standards and requirements for the practicing of nursing as a profession. Opposition is being raised in Pennsylvania concerning the Gans bill which would annul the existing nursing practice act there and would open the ranks to any person who chose to care for the sick.

The American Social Hygiene Association is following bills in twenty-three states. Compulsory reporting of venereal diseases is proposed in Arkansas, Kansas, New Jersey and North Carolina; Vermont proposes to register persons for whom prescriptions for venereal disease treatment are made up by druggists; prohibiting of marriage of venereal diseased is proposed in Arkansas, California, New Jersey, Oregon, and South Dakota. Other bills of somewhat similar nature are pending in Connecticut, Indiana, New York, West Virginia, New Hampshire, Ohio, and Wisconsin, which would tend to bring the control of venereal diseases within the scope of the health department. Several other bills aimed at the suppression of prostitution are reported from California, Delaware, South Carolina, Washington and Wyoming. Massachusetts would prohibit the employment of students as vice inspectors. Advertisements of "cure," for venereal disease are to be prohibited in Kansas and New Jersey.

Provisions for child welfare work are being considered in New Hampshire and Washington. The National Committee for Mental Hygiene and the Committee on Feeblemindedness report bills for the establishment and extension of institutions for that sort of work in Arizona, Arkansas, California, Delaware, South Carolina, Washington, Utah, Oklahoma, West Virginia, and Pennsylvania. Sterilization of the criminal and insane in state institutions is proposed in Kansas, Ohio, and Oregon. Massachusetts, New York, and Indiana plan greater extension of their hospital service. Massachusetts further plans a very complete program for surveys of feeblemindedness in schools and in society at large.

Many other bills are reported for the promotion of work of the anti-tuberculosis societies; for the extension of hospital service of every nature; for the reorganization of the Ohio State Board of Health; and for the many other protective measures necessary for health conservation.

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A Guarantee.—Figuring in dollars and cents and lives, the Connecticut State Board of Health through the medium of its March *Monthly Bulletin* makes the following proposition to the people of that state:

"The State Board of Health guarantees to show one life saved for every $500 placed at its disposal.

"Properly applied funds will conserve life and health. As our neighbor, New York, says, 'Public health is purchasable. Within natural limitations, a community can determine its death rate.'

"So well established has become this fact, and so carefully has the state board studied the conditions in Connecticut that we can go our neighbor one better and make the above definite proposition.

"This proposition means that if the $119,000 asked of this Legislature is allowed, the State Board of Health agrees to save 236 lives within the next two years. It appears to be a big undertaking but it can and will be done if the opportunity is afforded.

"The saving of 236 precious lives is not all—considerable unnecessary illness will be prevented and a great economic saving will be accomplished.

"A human life is valued at $1,700. If it costs $500 to save one of these lives the total saving to the state on an investment of $119,000 will be $401,200 or a net profit of $282,200 on the investment.

"Insurance companies have found that the money they spend to conserve the health of their policy holders is the best investment they can make. So amazing have been the results that they are now spending enormous sums and are reaping handsome profits.

"The prosperity of an insurance company is in ratio to the health of its policy holders and the prosperity of the state is in ratio to the health of its citizens.

"It is the duty of the state to provide for the welfare of its citizens,—it is also its duty to invest the funds at its disposal to best advantage.

"Can a guaranteed dividend of 240 per cent. be ignored?"

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Diphtheria Deaths and the Use of Antitoxin.—During the year 1916 there were in the city of Boston 1, 951 cases of diphtheria resulting in 133 deaths, mostly among young children. The January *Monthly Bulletin* of the Health Department of the city of Boston reports the results of an investigation of these deaths, with the conclusion that it "seems reasonable that a certain reduction in the mortality from diphtheria might be obtained by the earlier use of antitoxin. If the clinical appearances are so suspicious that diphtheria seems probable antitoxin should immediately be given without waiting for further development of the disease or for laboratory diagnosis. Of course, in every case of a suspicious throat a culture should be taken, but when the physician's judgment balances to the diagnosis of diphtheria then antitoxin should be given at once, at the time the culture is taken. The inconveniences caused by antitoxin in a case that happens not to be diphtheria are not to be compared with the serious if not fatal results that might ensue from delay in its administration."

The report concludes with the following recommendations for the methods of administration of the antitoxin: mild cases, subcutaneous or intramuscular; moderate cases, intramuscular or subcutaneous; severe cases, intramuscular or subcutaneous or intravenous; malignant cases, intravenous.

Public Health Notes

Application of the Typhoidin Test.—"There seems little further reason to doubt that the skin sensitiveness to the preparations of the typhoid bacillus (typhoidin) described by Gay and Force in typhoid vaccinated individuals and in typhoid recoveries is to a large extent specific." This is the statement of Gay and Lamb in *The Jour. Laboratory and Clinical Medical* for January, 1917.

The typhoidin test consists of injecting intradermally a small quantity of a preparation of dead typhoid bacilli. The criterion of a positive reaction is the presence after 48 hours of a definite indurated papule, plus a reddish areola of at least five millimeters diameter. Such a reaction seems to indicate immunity to typhoid.

The authors report the typhoidin reactions of 154 physicians and nurses at the Presbyterian Hospital, New York, as follows:

I. Of 12 cases giving a definite history of antecedent typhoid fever (2 to 22 years previously), nine, or 75 per cent. were positive to typhoidin;

II. Of 121 cases vaccinated against typhoid, 78 cases, or 65 per cent. were positive to typhoidin. The reactions varied according to the lapse of time since vaccination and to the type of vaccine used, the reaction apparently falling away as time went on. In three to five years after vaccination, only 40 per cent. reacted positively.

III. Of 21 normals giving no history of typhoid or typhoid vaccination, three, or 14 per cent. reacted positively to typhoidin.

Commenting on the first group, the authors believe that while second attacks of typhoid are somewhat rare, nevertheless, the immunity must be considered as relative, as second cases are known to have occurred in from 8 per cent. to 15 per cent. of the instances where massive infection takes place.

Of the presumably normal individuals that gave a positive reaction several conjectures are made: Non-specific susceptibility of the skin; previous abortive and unrecognized attacks of typhoid; the carrier condition.

The authors believe that the positive reaction indicates more or less perfect protection against typhoid. In no person in whom the positive

reaction was found, has typhoid developed; while, on the other hand, in three individuals giving a history of vaccination and in whom a negative reaction was subsequently obtained, typhoid fever shortly thereafter occurred.

It is believed that a negative indicates the necessity of re-vaccination against typhoid.

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The Schick Test and Natural Immunity.—An exceedingly important hypothesis is stated by Abraham Zingher as a result of his studies on the Schick test. His theory, which he italicizes, is as follows:

A susceptibility to one of the less contagious diseases indicates that the child is also more apt to be susceptible to other contagious and infectious diseases.

He finds that whereas among normal children between the ages of two and four, about 32 per cent. are positive* to the Schick test, among scarlet fever patients, 65 per cent. were positive to Schick; and among poliomyelitis patients, over 80 per cent. were positive to the Schick. In other words, scarlet fever patients are twice and poliomyelitis patients three times as susceptible to diphtheria as normal children. Zingher believes that this is not due to lowered resistance during scarlet or polio, but to lower natural immunity; since no lowering of the amount of antitoxin in the blood is detectable during the course of the disease.

Scarlet fever and polio are both classed among the less infectious diseases, scarlet being only a fourth as infectious as measles, and polio only a fifteenth as infectious as scarlet. The author then extends his findings to all infectious diseases, and suggests that immunity to the less infectious diseases like the two mentioned, indicates a natural immunity to the more infectious diseases also.

In the case of measles patients, the susceptibility to diphtheria was only 10 per cent. higher than the normal, which was to be expected, since practically all children are susceptible to measles (about 96 per cent.).

The article appears in *American Journal of Diseases of Children*, March, 1917.

*Editoral Note.—It is well to bear in mind that with the Schick test, a positive reaction indicates *susceptibility* to diphtheria, while, on the other hand, a positive typhoidin reaction indicates *immunity* to typhoid.

Twenty-Five Cents a Day for Food.—The recent increase in the prices of food-stuffs has stimulated a number of experiments aiming to show the possibilities of low-priced diets. Not the least interesting of these is that of the Life Extension Institute.

In its Monthly Health Letter No. 34, the Institute describes the experiment, the purpose of which was that "of carrying to the people a clear message on these simple, fundamental principles of food values, of which so few housewives or others upon whom devolves the responsibility of feeding the family, have any adequate knowledge."

Twelve policemen from the Training School of the New York Police Department acted as subjects. Their average weight was 170 pounds, or 15 pounds heavier than the average man. Eugene L. Fisk, M. D., Medical Director, and Prof. Irving Fisher, Chairman of the Hygiene Reference Board of the Life Extension Institute, directed the experiment. The dietaries were planned with the coöperation of Prof. Mary S. Rose of Columbia University.

The food was purchased at retail, and while of the highest quality, was chosen with a view to selecting elements that counted most for the money, while at the same time contributing palatibility, wholesomeness and nutritional balance. Eggs, cabbage and lettuce were excluded, nut margarine (a wholesome and palatable butter made from peanut oil and cocoanut oil) was substituted for butter, and meat was served only once a day as a rule. Following is a sample menu for a day:

Tuesday, January 23d:

Breakfast—Oatmeal and milk, crullers, rolls and nut butter, coffee.

Luncheon—Potato soup with carrots, rye bread and nut butter, stewed prunes and ginger snaps, tea.

Dinner—Parsnips, baked with sausage, samp, whole wheat bread with nut butter, bread pud ding, fruit sauce, tea.

The experiment is said to have been completely successful in that the men were maintained in excellent physical condition, the menus being so satisfactory and appetizing that overeating resulted and there was a gain of 29 pounds in the weight of the group as a whole. Further, the blood-pressure of the group, which at the

start was 5 mm. above the normal, was reduced to exactly normal at the end of the three weeks.

The cost was 25 cents for 3,500 calories, and as the average requirement of a business man of 155 pounds is said to be about 2,500 calories, the experimenters state that the latter could probably be fed for 20 cents per day, or less, and still be well nourished.

It is admitted that the average housewife, untrained in dietetics, on attempting to feed her family on 25 cents per individual daily would be in great danger of feeding them improperly; however, it is claimed that the necessary knowledge is easily acquired if one will put the mind upon it. A description of the experiment, together with a clear exposition of the simple principles of dietetics for use of the housewife is offered by the Life Extension Institute for ten cents. It is advised that where means permit, more milk, eggs, green vegetables and fresh fruit be used, especially where there are growing children, although for adults the menus suggested would furnish a proper amount of protein. fuel foods, minerals and vitamins.

The recommendations of Fisher and Fisk are attacked by Lawrence Irwell in the *Medical Times* for March, 1917. His very caustic article claims that vegetable protein will not take the place of animal protein, and that the excess of peas and beans would cause flatulence. The low quantity of bulky foods, like carrots and turnips would promote constipation, and the limited cost would prohibit a sufficiency of the vitamin furnishers, such as fresh fruits and vegetables.

A Typhoid Carrier for 55 Years.—What appears to be the longest persistence of the typhoid carrier state ever noted, is reported in the *Zeitschrift für Hygiene* (V. 80, No. 3), by Dr. Hans Martz.

During 18 months prior to June, 1913, eight cases of typhoid of mysterious origin occurred in the Basle City Hospital. The inmates and attendants were examined, and of 72 Widals, sixty were negative and eight positive, and four suspicious. Of the 72 stools, 71 were negative for B. typhosis, and one positive. Further investigation showed that this case was responsible for the eight cases of typhoid.

The carrier was a demented woman 75 years old. Inquiry showed that she had had typhoid 55 years previously, in the course of an epidemic in 1859. Her urine was negative for the typhoid bacillus, although her stools were positive.

No direct proof exists that the carrier state persisted for half a century, but in view of proof by bacterial control that the condition has lasted 10 years in other instances leads the author to infer the long duration in the present instance. When the usual prophylactic measures were followed (cleanliness, disinfection of stools, barring from food handling and the use of common toilets, etc.), no more cases occurred in the Basle Hospital.

The author believes that the Widal is a valuable aid in the detection of carriers. He finds also that the excretion of bacilli is intermittent (schub-weise), and that at least three examinations are advisable before pronouncing a negative. The use of purgatives favors the appearance of the pathogen in the stool. Periodic bowel disturbances—diarrhea alternating with constipation—is believed characteristic of the carrier state.

No method of clearing up the carrier condition is known.

Housing and Tuberculosis.—In the *Journal of the Outdoor Life* for February, 1917, Mr. Seymour H. Stone, Secretary of the Boston Association for the Relief and Control of Tuberculosis, discusses "House Infection and the Spread of Tuberculosis."

Mr. Stone cites several familiar investigations which show that many cases have probably been contracted from infected houses. Notable among these citations is the study made in Philadelphia under the direction of the Phipps Institute, by Dr. Frank A. Craig. In conclusion, Dr. Craig states that from their studies one might be led to the conclusion that house infection was a prolific source of danger. He does not, however, believe this to be the case.

Other factors in the spread of the disease, such as the environment and habits of the individual, are considered. In this connection Dr. Charles J. Hastings of Toronto is quoted as follows:

"People live in poor houses because of cheaper rent, and when it is necessary to cut down the rent it is usually necessary to cut down the other

necessaries of life, such as fuel supply, food supply, clothing, etc."

Various references are given to show that the bacilli lose their virulence within ten days and the length of life of the tubercle bacillus is very short.

Mr. Stone's conclusions follow:

"In closing let me say that from a study of the material which I have presented I think we are warranted in drawing the following conclusions:

"1. While there probably is such a thing as infected houses, such houses, comparatively speaking, are not a source of great danger. Virile germs have been found in houses, but there seems to be a doubt in the minds of many as to whether such germs would find it easy to enter the human system.

"2. We need evidence that all other causes contributing to infection have been eliminated, such as working conditions, overcrowding, kind and amount of food, lack of light, air, and sanitation, wages, bad habits, etc., before we can charge up infection to the house. So far, I have not been able to discover any such evidence in any given case.

"3. Many experiments with tubercle bacilli would seem to indicate that they lead a comparatively short life, their virility diminishing rapidly, though there are, of course, some instances that point to the contrary.

"4. We seem to have pretty conclusive evidence that infection by fresh living bacilli through droplets and direct contact is probably the source of a very large proportion of cases, percentages ranging from 50 to 95 per cent. If these percentages are correct is it not further evidence that house infection does not very often occur?"

The Clarification of Milk.—E. G. Hastings, Madison, Wis. (*Journal A. M. A.*, March 24, 1917), speaks of the clarification of market milk as one of the important developments of late years in the industry. There is a certain amount of insoluble dirt in every natural milk, the grosser parts of which are removed by strainers of cloth and wire. With the advent of the milk bottle, sediment which formerly passed unnoticed has become evident and means of removing it are called for. The introduction of the clarifier, a machine in which centrifugal force is applied to the milk to remove materials which would settle through force of gravity, has caused clarification to be looked on with favor by the milk dealers and has been demanded by ordinances in some communities. Hastings briefly reviews certain papers by McClintock and Hinkleman which have been largely used to support the demand for clarification, and also quotes others by Bohlmann and Hammer which favor the opposite view, and says that in general the results of careful workers indicate that the bacterial content is apparently increased considerably. "There is, of course, an actual decrease in case the contamination from the machine does not exceed the number of bacteria present in the slime removed by the process. The increase is an apparent one due to the breaking up of clumps of bacteria in the milk and therefore an increase in the number of colonies on the plate cultures. The important point is that the clarification process has no favorable effect on the keeping quality, and there is no reason to believe that such a proportion of harmful kinds of bacteria is removed that the healthfulness of the milk can be said to be improved." One of the most interesting statements made by the advocates of clarification is that the process removes the disease producing bacteria because their toxins make them heavy. Frankly stated, the process provides a way in which the dirty milk can be sold without the knowledge of the customers. The introduction of pasteurization, which has been opposed by some because it enables the dealer to handle a poorer quality of milk than he otherwise could, is, admitting this, a safety first method as producing a safer and better keeping quality than that of the raw milk.

A New Type of Trickling Filter.—The *Journal of The Royal Sanitary Institute* for December, 1916, describes a new method of trickling filter construction. The author of the article, Lieut.-Col. G. G. Nasmith, C. M. G., Ph. D., is Director of Laboratories, Department of Public Health, Toronto, Canada, in which city the new construction has been tried out.

The trickling filter and the recent activated sludge method are considered the only methods of sewage treatment which successfully take advantage of the oxidizing properties of living microörganisms.

Experiments were begun in 1912 to reduce the estimated cost of filter-beds in Toronto. Greater surface of the filter per cubic yard and freer circulation of air in the bed were sought for. Ordinary wooden laths were used. The laths of the lowest layer were laid parallel to one another, the spaces between the laths being a little less than the width of the laths themselves. A second layer was laid on top of this and at right angles to it, with the same interspace. A third row was laid parallel to the bottom row, but in such a manner that the laths covered the spaces left between the laths of the lower series. In this way a filter four feet in depth was constructed, in which the sewage in order to reach the bottom had to flow over a very large surface of filter. Air could enter from all sides and the top.

The filter was mature in less than a month. This lath-filter was found to treat six million gallons of sewage per acre per day, yielding a non-putrescible effluent, while a standard type of stone filter, operated side by side with it as a control, treated two million gallons only. Satisfactory results are still being obtained after three and a half years of continuous service.

Slabs of wood were also experimented with but were discarded, as it was only possible to treat three and a half million gallons per acre per day.

Bundles of brushwood have been found to make a successful filter. The old revolving distributing sprinkler is used and the same rate of treatment is obtained with brushwood as with the lath-filter.

As the wood is always covered with slime and is continually soaked, no decay takes place.

Because of its cheapness and efficiency the brushwood filter is especially recommended.

✠

Sanitary Drinking Fountain Attacked.—Our attention is again called to the sanitary drinking fountain by article appearing in the March issue of the *Journal of the American Water Works Association*.

The author, Mr. J. H. Dunlap, observes that most so-called sanitary fountains are little better than the old public cup. The fountain is reprehended for two reasons: First, it is constructed with too much confidence in the intelligence of the public; and second, it is made with too little attention to the laws of hydraulics.

"The average individual in drinking from public fountains will not hesitate to adjust the height of the jet of water so that his lips may conveniently rest upon the metal of the bubbler. The valves should be so made and the regulating devices so designed that the jet will rise to such a height as to make contact with the metal impossible." Six out of thirty-nine manufacturers equip their fountains with guards to prevent mouth contact with the bubbler.

It is further stated that bacteria obey the same law that is observed when one sees a ball dancing in the jet of a public fountain, and that they often remain in the jet for an indefinite length of time.

The results of the experiments, by which the sanitary fountain with the vertical jet was discredited at the University of Wisconsin, with their accompanying conclusions are set forth in the article.

✠

Handling the Kickers.—The journal last cited above prints a paper by Earl T. Kirkpatrick on, "Experience in Handling Bad Water Complaints and Laboratory Control."

The majority of complaints are said to come from the users of water from dead ends where the water has acquired a slight taste or odor from some harmless microscopic growth or mineral.

A plan, for the curtailment of water waste caused by unnecessary blow-offs of dead ends, and the education of the public in some matters relating to the sanitation of water, is described.

When a complaint comes in it is at once referred to the laboratory and an inspection is made. Dissolved iron is found to be the chief cause of dissatisfaction. Only in the event of a great amount of iron is the end of the main blown off but in every case effort is made to explain the existing situation to the satisfaction of the complainant and he is made to feel that his interest and coöperation are appreciated.

The chronic kicker seems to lose interest in his self-appointed task when he is encouraged to continue his good work.

Public Health Activities in the Southern States.—The present status of public health activities in the Southern states, with suggestions for increased efficiency, is described by Dr. W. S. Leathers, Director of Public Health of Mississippi, in the *Southern Medical Journal* for March, 1917.

The laboratory is regarded as a corner stone in public health organization. Practically all of the Southern states maintain laboratories and efficient work is being done.

Vital statistics do not as yet command the important place in health work in the South which they should. At present only five Southern states are included in the registration area.

Past experience has shown that the proper sanitation of towns and cities is more quickly secured when the work is done under the supervision of the state board of health. The author deems it necessary for each state board of health to have a sanitary engineer who shall advise and pass on all plans for the protection of water supplies, and also on the architecture of buildings of public utility.

Owing to the large per cent. of rural population, special consideration is due this class of people. The "intensive method of health work" is recommended. This plan, with some of the excellent results obtained, is cited in the article.

Several Southern states have been conducting successful educational campaigns in health work but greater efficiency and greater expansion of the propaganda are urged.

Health activities are increasing in popularity among the masses and this is considered by the writer to be the best index of the great progress of health organization and activities in the Southern states.

A division of child hygiene, and a bureau of communicable diseases with a competent epidemiologist in charge are needs of each department of health.

Doctor Leathers states that while the malaria index has been reduced in many municipalities, it is actually increasing in many rural districts. The forces and conditions causing this disease are at present more than balancing the agencies employed for eradication.

Industrial Hygiene and Sanitation.

Women in Industry Abroad.—A recent report entitled "Labor, Finance, and the War" represents the results of a study carried on under the direction of the British Association for the Advancement of Science, and deals with the effect of the war on the industrial conditions of Great Britain. One chapter is devoted to the subject of the replacement of men by women in industry during the war, down to April, 1916. Over half a million women were added to the ranks of labor between the outbreak of the war and the spring of 1916. In mid-April, 1916, the number of women employed was 5,490,000. It is estimated that in April, 1916, there were 523,000 women directly replacing men and 737,000 replacing men either directly or indirectly. The instances in which women are found completely to be replacing men on skilled work are very few. It is interesting to note that the general opinion of the employers bears out the accepted view that women are lacking in the higher industrial qualities but excel in deftness of touch and in continued application to a routine operation. These results, however, are not very conclusive since the opinion came in great part from employers of women who had received only a minimum education. The general opinion is that women, particularly if married, do not take kindly to night work, and that their output is less by night than day. Men generally earn more than women but there is a greater correspondence between the wages earned by the two sexes for the same work. The question of women in industry after the war is as yet largely a matter of speculation. A great deal depends upon the action of the trade unions. A summary of conclusions arrived at in this interesting report can be found in the March number of the *Monthly Review of the U. S. Bureau of Labor Statistics.*

The *Review* also contains a brief article which deals with the employment of women and boys in munition works in Italy. The under secretary for arms and munitions issued two circulars during the latter part of 1916 in which he urged a greater employment of women in such works.

It appears that in Italy the employment of women in munition factories has met with passive resistance in some districts on the part of the employers, in others on the part of the workmen, or, owing to prejudice and traditional notions, on the part of the women themselves, whose aversion has been unmistakable and persistent.

✱

"Maintaining Interest in Accident Prevention" is the title of an article in the February issue of *Safety Engineering*. No one interested in the "Safety First" movement can afford to miss the article unless he personally attended the general round table discussion at the Fifth Annual Congress of the National Safety Council. The round table discussion reported on in detail in this article was participated in by representatives of large industrial concerns and each representative had something of practical value to report.

✱

"Labor Laws and their Administration" is the title of Bulletin number 211 recently issued by the U. S. Bureau of Labor Statistics. In it are discussed industrial and labor conditions, state activities regarding unemployment, the worker and his wages, woman labor, child labor, mediation in labor disputes, the safety of the worker, the health of the worker, accident compensation, and the organization of administrative agencies.

✱

Safety Work Must Become More Definite and Democratic.—The March *Safety Engineering* editorially comments on the views relative to the safety movement as recently expressed by Mr. A. B. Jones, Director of Plant Administration of the B. F. Goodreich Co., Akron, O. The points emphasized by Mr. Jones are so pertinent that we have reproduced them here in part, through the courtesy extended by *Safety Engineering*.

"Industry," states Mr. Jones, "must consistently endeavor to promote the safety of all who are employed in the common service of production. The 'Safety First' movement is an attempt to prevent all accidents. The first few years of its life have naturally been spent in experimentation and in safeguarding the most obvious sources of injury. Only now are we beginning to reach a point in our knowledge where we can definitely plan campaigns that will effectively conserve the life and limb of all engaged in manufacture.

"Accidents have already been greatly reduced both in number and in severity. But preventable accidents still occur. Our limited success in the past makes our conviction the more sure that all accidents are preventable, and that their presence in any factory is a challenge to the intelligence of the management and the men. In the future, every manufacturer must work more definitely along two lines:

"(1) *He must see to it that machines are properly safeguarded at the time of purchase.* I believe that the time will come when industrial concerns will make the matter of adequate safeguards a requisite in the purchase of machines equally important with the consideration of price and general utility.

"(2) *The movement must be made sufficiently democratic to arouse the enthusiasm of the employes,* and to make them gladly assume their full share of responsibility for accident prevention. Methods for doing this will vary under the different systems of industrial management. Whether it be done through shop committees or a centralized executive staff making full use of educational bulletins, lectures and house publications, is only relatively important; the great essential is that it be done.

"Accident prevention is but one phase of the general problem of industrial relations. Safety work must be intelligently coördinated with health work, and with the effort continually to adjust labor grievances and to improve labor conditions. Business can succeed only by securing the good will of the consuming public through the intelligent and enthusiastic coöperation of all who serve it. Prevention of accidents, the conservation of health, the promotion of efficient workmanship and right living pays, in a commercial sense, since they are fundamental factors in securing the good will and the full productivity of the workers and thereby contribute directly to the success of the organization."

✱

Workmen's Compensation Laws Upheld.—Any question as to the right of the states to enact workmen's compensation laws has been

permanently settled by the recent decision of the United States Supreme Court. Not only has the right and power of the state to enact such legislation been affirmed, but the three leading types of workmen's compensation legislation have also been declared legal. In Iowa, the law is elective, both employer and employee being at liberty to elect whether to work under the statute or under the common law principles regulating relations between employer and employee. But inducements are offered to the employer to come under the law by specifically removing the three common law defenses, namely, the fellow servant doctrine, the voluntary assumption of risk on the part of the employee, and contributory negligence on the part of the injured person; while it also offers inducements to the employee in the form of a fixed schedule of compensations for injuries in place of the uncertainty of a jury verdict or a court finding. The New York law is essentially compulsory, but allows the employer to carry his own risk or to insure in either a private insurance company or a state fund; while the Washington law is not only compulsory in its application, but much broader in its provisions, including domestic and farm laborers as well as industrial employees, and requiring all employers to insure in the state fund without admitting private companies in any way. All three of these laws were before the court for review, and they were all sustained so far as constitutionality is concerned. This decision settles the right of the state to enact workmen's compensation laws in any of the three forms which were before the court. The interest of physicians, therefore, will hereafter center in the securing of equitable terms and conditions for medical services.—*Journal of the American Medical Association*, March 24, 1917.

✦

Child Labor and the War.—The Thirteenth National Conference on Child Labor closed its sessions at Baltimore with conviction firmly established that whatever war measures this country is obliged to adopt there should be no let down in the standards for child protection. Time and again this note was struck as Julia C. Lathrop, Dr. Stephen S. Wise, Dr. Felix Adler, and Owen R. Lovejoy pointed out the vital necessity of continuing all efforts to further our American democratic ideals even if at the same time this country must take part in the fight for world-wide democracy. The lowering of standards abroad was used by Miss Lathrop and Mr. Lovejoy as an illustration of the fact that the excitement of war is fatal to the training and development of the younger generation and that social advance is retarded when childhood is impoverished. Dr. Felix Adler spoke of the fact that the tide of democracy is rising in Europe and that the people there will turn to us for help in the solution of their problems of free government. "In some respects we can confidently point to our example," said Dr. Adler, "but do we want Russia to adopt along with other institutions our system of child labor?"

The rest of the sessions were devoted largely to a discussion of the measures for which the federal child labor law has paved the way. Enforcing officials, Hon. John Price Jackson, of Pennsylvania, and Hon. Charles J. Fox, of Maryland, expressed their satisfaction that the federal law would reach some obstinate forms of child labor that the states had not been able to handle —the canneries of Maryland, for instance—and that the coöperation of state and federal enforcing officials would lead to a much more thorough enforcement of child labor laws, and Miss Lathrop, after explaining the steps that had been taken for the administration of the law said she believed the federal statute would greatly stimulate legislation in the states.

Forms of child labor that are to be found in every state in the Union and yet will not be touched by the federal law were discussed at some length. The use of children in the making of motion picture films was described by Miss Jeanie Minor of the New York Child Labor Committee as a form of child employment in need of nation-wide regulation. Following an investigation of the kind of work these children are called upon to do, New York passed a law forbidding their employment without a permit. As a result the producing companies are moving their studios to New Jersey where there is no regulation. At the session devoted to the agricultural problem, Mrs. G. H. Mathis, Field Agent and Agricultural Lecturer of the Alabama Bankers' Association, said the trouble in the South was that the farmers were so hopelessly

poor they were obliged to use their children. The solution, she felt, lay in teaching these people how to run their farms so as to make them pay and then the children would be sent to school. Dr. Edward N. Clopper, of the National Child Labor Committee, spoke of the agricultural problem as the illusion of the near —so near to us that we are unable to see it.

Other ways for making the world a better place for children were suggested by C. C. Carstens, of Boston, and Roy Smith Wallace, of Philadelphia, who advocated the codification of all child welfare laws in order to avoid the present confusion and duplication, and by Dr. John Dewey and Hon. P. P. Claxton who emphasized the need of federal aid to elementary education as a means of equalizing the educational opportunities of children throughout the country.

✻

Medals for Safety Work.—Arthur Williams, president of the American Museum of Safety, announced on March 16 the winners of four of the five gold medals awarded annually to firms or corporations that have done most to forward industrial safety. The E. H. Harriman memorial medal, which is given to the railroad that has the best year's record, is to be awarded later.

The Anthony N. Brady medal for the American electric railway which has done most to conserve the health and safety of its employes and patrons, was assigned to the Connecticut Electric Railway of New Haven. This company operates its road through more than a dozen cities, including Bridgeport, Waterbury, and Hartford, where traffic has been complicated by the influx of munition workers.

For a device which will greatly reduce the chances of coaches telescoping, the *Scientific American* medal was given to the Pullman Company. The Louis Livingston Seaman medal for progress in the promotion of hygiene and mitigation of occupational diseases, goes to the Julius King Optical Company, New York. The Travelers Insurance Company's medal for protecting the lives of workers is bestowed upon the Commonwealth Steel Company of St. Louis. —*Safety Engineering*, March.

✻

Following the Example set by other countries with progressive tendencies as to labor legislation, the Hungarian Parliament, on March 19, 1916, enacted a law making it obligatory for large cities and communes to maintain public employment offices. The law provides for the granting of subsidies from the state budget.

✻

The Monthly Review of the U. S. Bureau of Labor Statistics (March, 1917) contains an article on "Government Control of Food Supplies in European Countries" which is of great timely interest. It is a summary of the measures as to food control taken by the Bristol government. Like measures of other governments will be summarized and published in the *Monthly Review* for April.

✻

The Ford Motor Company of Detroit, Mich., publishes a monthly bulletin for the benefit of the employees. These bulletins serve the purpose of acquainting the employee with the nature of the welfare work carried on by the company. There are chapters on Health, Safety First, Legal Aid, Banking, and Home and Library. Suggestions are welcomed and adopted if feasible. Those whose suggestions have been adopted are credited and put on the Honor Roll.

✻

One Hundred Girls and Women of the H. D. Lee Mercantile Company, employed in the garment factories in Kansas City, have recently been clothed in overalls, as a precaution against accidents. The plan was adopted on the suggestion of the insurance agency, of which the Lee company is a client.

✻

The National Safety Council will hold the Sixth Annual Safety Congress in New York City commencing Monday, September 10. The American Museum of Safety and the National Safety Council will hold a conjoint exhibit of safety devices.

✻

For the Comfort and Convenience of employees the National Cash Register Company at Dayton, Ohio, supplies employees during stormy weather with umbrellas and rubbers free of charge. Both must be returned not later than the following work day.

The Chicago Medical Society has issued a pamphlet condemning in no uncertain terms compulsory health insurance, and urges the Illinois Legislature to kill the bills now before it which have been drafted by the American Association for Labor Legislation.

✱

The National Association of Manufacturers has appointed Mr. Carl M. Hansen, well known to the "Safety" world through his activities in the field of accident prevention, compensation and casualty insurance, to the chairmanship of the Association Committee for Accident Prevention and Workmen's Compensation. For some time, Mr. Hansen has been managing director of the Pennsylvania Mutual Liability Association. He is the author of "Universal Safety Standards" a work of thirteen volumes.

✱

After Many Months of Analyzing and collating the circumstances of a very large percentage of the fires which occurred in New York during 1915, the Actuarial Bureau of the National Board of Fire Underwriters, has ascertained the causes of these fires, with their relative losses. The detailed figures can be studied in the February *Bulletin* of the American Museum of Safety. Among the "Strictly Preventable Causes" defective chimneys and flues figured as 4.1 per cent. matches as 4.3 per cent., smoking (cigars, cigarettes, pipes) as 4 per cent., and stoves, furnaces, boilers and their pipes as 4.3 per cent. Of "Partly Preventable Causes" exposure ranked highest with 14.3 per cent. Fires due to "Unknown Causes" amounted to 46.5 per cent. of the total and entailed a loss of $9,346,286. A loss of $4,358,618, is to be charged up to "Strictly Preventable Causes."

✱

The "Safety" First Movement is strikingly brought out in Illinois statistics where the number of accidental deaths by railways and electric lines during 1916 have been reduced by 286 and the number of persons injured by 1,489.

✱

The Ontario Safety League published their third annual report, constituting a brief statement of the fire and accident prevention campaign conducted during the year 1916. The league is very active. Its work includes the presentation of motion pictures, the distribution of school bulletins, industrial bulletins and letters to parents. The bulletins are snappy and highly instructive.

✱

Dr. I. W. Ballantyne recently read a paper before the English Society for the Study of Inebriety, giving his own findings. They practically represent his whole life work—and quoting the experiments of Stockard and Papamiolaon upon alcoholized guinea-pigs. These experiments show that alcoholism in the parent does exert a baleful influence upon the germ cells, individually and collectively as the embryo and the fetur. Ballantyne concludes that alcohol is a danger to ante-natal health and a menace to antenatal life at every one of the stages of that existence and through each of the progenitors. This statement is of particular interest in view of the recent attempt to show that epilepsy, for example, is sometimes the result of impregnation at the time when both parents were alcoholized.

✱

The Fourth Annual Report of the Department of Workshop and Factory Inspection of the State of Tennessee covers the work which has been done during 1916. Satisfaction is expressed with the rapid improvement of conditions. Most of the report is devoted to tabulated matter.

✱

Safety Association Organized.—The Joseph A. Holmes Safety Association, made up of twenty-three societies, has been organized in Washington. Its objects are the betterment of mining conditions and of relations between operators and miners. The association will award annually one or more medals with honoraria, to be known as the Holmes Award, for the encouragement of more efficient safety devices, appliances or methods in mining, for personal heroism or for distinguished service or saving of life in any branch of the mining industry.—*Journal of the American Medical Association.*

Communications.

To the Editor:

In the issue of your JOURNAL of December, 1916, there appears an editorial on bubble fountains based on the report of Pettibone, Bogart and Clark of an epidemic of streptococcus sore throat at the University of Wisconsin, probably due to bubble fountains. I presume that every one who has made a study of bubble fountains has recognized that they are possible sources of danger when they are badly constructed or when the stream is too low. This is especially true of some of those sold by large manufacturing firms where the outlet is surrounded by a cup several inches in diameter with only one or more small holes for drainage. Such a bubble fountain is practically impossible to keep clean.

These authors state that cultures introduced into the top of the stream remain there for a considerable length of time, 135 minutes in one case, and on an average of 25 minutes. The explanation given by them of their findings, namely, that the bacteria "dance" in the top of the stream much as a ball is supported by a jet, appears to be fanciful. If this is the explanation, then the remedy proposed, namely, the setting of the fountain at an angle, can not possibly be efficient. It is well known that a jet will support a ball even when that jet is set at an angle approaching 45 degrees, and furthermore, that the ball will be supported below the axis of the jet. This would seem to prove that the explanation given is not correct.

A SUBSCRIBER.

March 14, 1917

To the Editor:

In view of the appeals for thrift and economy now going over the country, may I venture to make a suggestion.

Why should we keep on talking, and writing, and printing, "infantile" paralysis when we can at one blow both economize and "strike ile"?

Some years ago it was almost universally customary to talk, write and print about "infantile" mortality, but time and attrition seem now to have wholesomely reduced this term to "infant" mortality.

Is it not about time for us to do the same for "infantile" paralysis? The words "infant" and "infantile" appear to be virtually synonymous, while to me "infantile" suggests retarded development rather than merely the period of infancy.

W. T. SEDGWICK.

March 5, 1917.

Personal Notes.

Several research fellowships in the Department of Preventive Medicine and Hygiene at Harvard University are available for the scientific investigation of food poisoning. The work may at the same time be credited towards the Doctor of Public Health degree.

This investigation has been organized by the National Research Council, and the work has been intrusted to Professor M. J. Rosenau, of Harvard. The results of the research will be published through the regular scientific channels.

The National Research Council, acting under the advices of Dr. William H. Welch, President of the National Academy of Sciences, has named the following Advisory Commission to have supervisory charge of the investigation: Prof. John J. Abel, Johns Hopkins University; Prof. Reid Hunt, Harvard University; Prof. E. O. Jordan, University of Chicago; Prof. Lafayette B. Mendel, Yale University; Prof. Frederick G. Novy, University of Michigan; Prof. Eugene Opie, Washington University; Prof. H. Gideon Wells, University of Chicago. The expense of the research will be assumed by the National Canners' Association.

Candidates should apply to Dr. M. J. Rosenau, Harvard Medical School, Boston, Mass.

The Civil Service Commission of the State of New York announces examinations for the state, county, and village service to take place May 5, 1917, which include the following list of positions: Junior Assistant, Engineering Departments $900 to $1,200, men only; Assistant Bacteriologist, State Department of Health, men only, $1,800, minimum age 25 years; Assistant Bacteriologist, State Department of Health, open to men and women, $900 to $1,200, minimum age 21 years. Non-citizens and non-residents admitted to examination. All applications should be in the hands of the State Civil Service Commission, Albany, N. Y., by April 25.

The McGraw Publishing Company, Inc., and the Hill Publishing Company, New York, have been consolidated as the McGraw-Hill Publishing Company Inc. The new company acquires all the properties and interests of the two constituents, including the following technical journals: *Electrical World, Electrical Railway Journal, Electrical Merchandising, Engineering Record, Metallurgical and Chemical Engineering, The Contractor, American Machinist, Power, Engineering News, Engineering and Mining Journal, and Coal Age.* Two of these papers, *Engineering News* and *Engineering Record* will be consolidated under the name, *Engineering News-Record,* with Mr. Charles Whiting Baker, now editor of *Engineering News,* as editor-in-chief. Mr James H. McGraw will be president of the new company, Mr. Arthur J. Baldwin (now president of the Hill Publishing Company) vice-president and treasurer and Mr. E. J. Mehren, vice-president and general manager.

The National Research Committee has recently appointed Dr. F. P. Gay of Berkeley, Cal., a member of its committee on hygiene.

Dr. P. E. Blackerby has been appointed registrar of the State Board of Health of Kentucky.

A bill has been introduced before the Nebraska State legislature calling for the transference of the state bacteriological laboratory from the control of the State Board of Health to the control of the University College of Medicine at Omaha.

Under the leadership of the St. Louis Tuberculosis Society, the many organizations in that city interested in public health work are organizing the St. Louis Public Health Association, with the object of instructing the people in the prevention of disease.

At the recent elections of the Oregon State Board of Health, Dr. A. C. Seeley was elected president of the board, Dr. M. B. Marcellus vice-president, and Dr. D. N. Roberg, was re-elected secretary.

Dr. J. M. Lowrey has been appointed health officer of Birmingham, Ala.

The Metropolitan Life Insurance Company on March 16, at their own expense, began a health survey of New Orleans, in coöperation with the Louisiana State Board of Health. The purpose of the survey is to determine the number of cases of disease in the city within a definite period and the nature of the care of those who are ill. Malaria is the first subject taken up.

Under the charge of Dr. A. P. Santry, a health clinic was recently opened in the city of Little Falls, N. Y., conducted by Miss Pearl N. Hyer, the city public health nurse.

Dr. Ludwig Hektoen of the University of Chicago, and Dr. M. H. Fischer and Dr. J. Eichberg, of the University of Cincinnati, have been appointed Cutter lecturers on hygiene and preventive medicine at Harvard University.

John Yates, secretary of the Associated Charities of Harrisburg, has been appointed secretary of the Associated Charities of Pittsburg.

Miss May Allison, formerly in charge of the Women's Educational and Industrial Union of Boston, has been appointed assistant secretary of the National Society for the promotion of Industrial Education.

Dr. H. L. Rockwood, formerly superintendent of the tuberculosis sanitarium of the Cleveland Department of Health, has been appointed chief of the Bureau of Tuberculosis of that city.

Dr. J. J. Galligan has been appointed assistant commissioner of health of Salt Lake City, Utah, to succeed Dr. T. J. Howells, who has resigned.

*

Dr. W. T. Burdick has resigned as city pathologist of Denver, Colo.

*

Dr. W. F. King has recently been elected president of the Indiana Sanitary and Water Supply Association. Doctor King is assistant secretary of the Indiana State Board of Health.

*

The following persons were elected to membership in the American Public Health Association, March 8, 1917:

Park B. Jenkins, M. D., Superintendent South Dakota State Board of Health, Waubay, S. D.

H. T. G. Naumann, M. A., City Chemist, Port Huron, Mich.

H. N. Calver, B. S., Laboratory Director, Winston-Salem, N. C.

Mr. Henry G. Parker, Brookline, Mass.

Sally E. Kutz, B. A., M. Sc., Instructor of Hygiene, Hunter College, N. Y.

John W. Plant, M. D., Michigan State Tuberculosis Survey, Lansing, Mich.

Mr. Roy R. Gockley, Instructor on Bacteriology, State School of Agriculture, N. Y.

W. P. Greene, M. D., Minneapolis, Minn.

B. A. Ledbetter, M. D., New Orleans, La.

A. T. McCormick, M. D., Bowling Green, Ky., Secretary, State Board of Health.

Prof. A. G. Woodman, Associate Professor of Foods, Massachusetts Institute Technology, Cambridge, Mass.

George S. Luckett, M. D., Washington, D. C.

S. N. Trockey, M. D., Chicago, Ill.

Talbot Reed, M. D., Health Officer, Atlantic City, N. J.

Mr. F. R. Georgia, Instructor in Chemistry, Cornell University, Ithaca, N. Y.

F. M. Routh, M. D., Greenwood, S. C.

I. B. Crilly, H. O., Altoona, Pa.

Mr. Jacob L. Crane, Jr., Assistant Engineer, State Board of Health, Lansing, Mich.

B. L. Schuster, M. D., Wilmette, Ill.

J. T. Howell, M. D., Health Officer, Hartsville, S. C.

G. McG. Stewart, M. D., United States Public Health Service, New Orleans, La.

Current Public Health Literature.

AMERICAN.

American City, New York.

XVI. March.

A New Method of Garbage Reduction. G. R. Tuska.
How Much Playground Space Does a City Need? Rowland Haynes.
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